This is a reproduction of a library book that was digitized by Google as part of an ongoing effort to preserve the information in books and make it universally accessible.

Google books

https://books.google.com





Digitized by Google



# Great Britain

Ministry of Information / had

LMiscellaneous Publications >

> Volume No. 4

he her cat

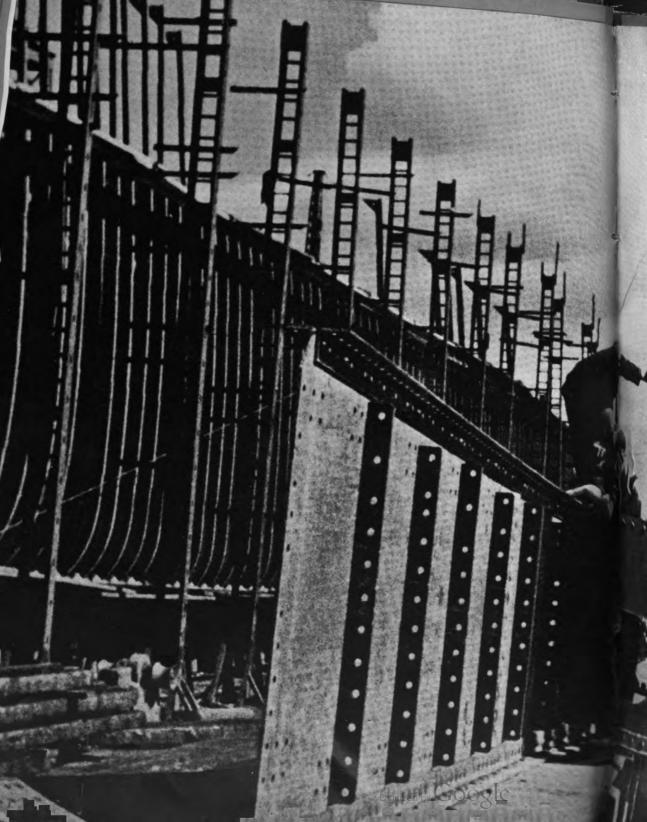
ANG 1946

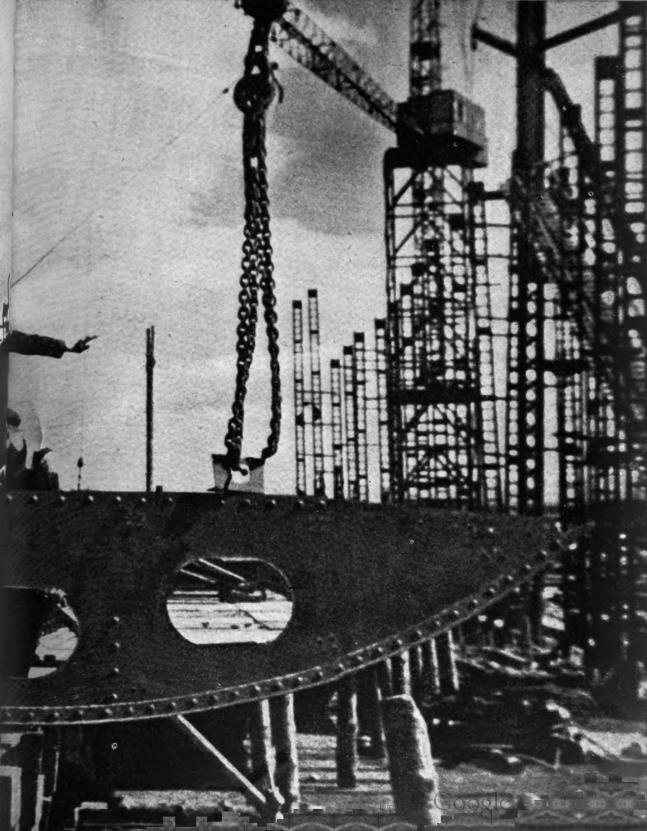
ANG 19

THE

THE OFFICIAL STORY OF THE SHIPYARDS IN WARTIME

One Shilling NET







# Build the ships

"Fill the Armies, rule the air, pour out the munitions, strangle the U-boats, sweep the mines, plough the land, build the ships." WINSTON CHURCHILL, 1940.

London: His Majesty's Stationery Office



Chapter	1	A man's job	PAGE 7
Chapter	2	Recruits and veterans	PAGE 13
Chapter	3	The shipyards turn to war	PAGE 17
Chapter	4	From drawing-board to plater's shed	PAGE 22
Chapter	5	The ship takes shape	PAGE 31

CROWN COPYRIGHT RESERVED. FIRST PUBLISHED 1946. PRICE IS.od. NET from His Majesty's Stationery Office at York House, Kingsway, London, W.C.2; 13a Castle Street, Edinburgh, 2; 39-41 King Street, Manchester, 2; 1 St. Andrew's Crescent, Cardiff; 8o Chichester Street, Belfast; or at any bookseller.



Chapter 6	The ship is born	PAGE 35
Chapter 7	Escort carrier number one	PAGE 43
Chapter 8	Ships on the operating table	PAGE 47
Chapter 9	Building the little ships	PAGE 55
Chapter 10	Epilogue	PAGE 62

OF THE ADMIRALTY.

Digitized by Google

THE TEXT WAS WRITTEN BY V. S. PRITCHETT

PREPARED BY THE MINISTRY OF INFORMATION WITH THE APPROVAL

Printed in Great Britain by C. Nicholls and Co., Ltd., S.O. Code No. 70-470\*



Digitized by Google

# Chapter 1

# A man's job

"Then the sixteenth day came," the sailor was saying. "The sixteenth day came and two more men died and still no sight of land. . . ."

The hull of a half-finished aircraft carrier stood like a wall under the cranes behind him; but for that, one might have been back in the eighteenth century listening to a story of piracy and marooning, thirst, hunger, scurvy and madness, like Alexander Selkirk's tale, and not to a modern seaman in a Harris-tweed overcoat, with spotted tie, brilliantine on his hair, and a microphone taking in his words. He talked well. His talk was like a page out of Robinson Crusoe. There was the dour, factual voice inflected by only the simplest, common emotions. You could imagine, after listening to this man, what it was like to be torpedoed; how you wake up with the wardrobe on top of you and the cabin door jammed and the sound of water, as if a gutter had broken suddenly, very near on one side of the ship. You knew what it was like to be in an open boat for a month, to watch fifty people die, to be picked up at last by a German armed cruiser, to be put in irons with a machine-gun in front of you when the cruiser was attacked, and to hear the order come from the German captain, when his ship in turn was hit and sinking, "Let them go. Let them take their chance with the rest."

The sailor was standing on a cart in the shipyard telling his story. It was the dinner hour, when there are forty minutes of grey Sunday silence. A crowd of a few hundred workers was listening to him. He stood up in the sun with his back to a shed on which some-

one had chalked "Give us Beveridge," while the workers in their caps and overalls listened with faces turned away because of the dust flying in the bitter wind. They were pale, glum, tallowy faces. A speaker would be disappointed or perturbed by them in the mass. What was going on in their heads? seaman looked so clean, sun-burned and athletic as he stood above this crowd of short, big-shouldered men with the caps over their eyes and a day's growth on their chins. You looked at the sailor's face, but you looked at the workers' hands; for their hands, hardened and in all shapes, were more expressive than their faces. The seaman was faced by one of the difficulties of the modern world—to remind a man what his job is for, to prove to him that it has a necessity, as well as a wage, attached to it: more important, to show him that you know it, too.

A woman of forty at a training centre was grumbling as she fiddled about with a file and six inches of steel: "I get pig sick of this," she said. "I want to get into the shipyards where I can see what I'm doing." The shipyard worker is lucky. He can see his job. He can see the ships around him. Even while the sailor was talking, the crowd could see the dazzled grey and white of a liner docking across the river. She had made dozens of voyages on her own; she was too fast for the U-boats and did not need to sail in convoy. The crowd had the profit and loss of the sea in their bones. Farther down lay the little Aconit, looking like a piece of stage scenery in her camouflage. "Ce bâteau est formidable,"



"THE SIXTEENTH DAY CAME." The sailor tells his story of torpedoing, open boats, tragedy and courage. The workers will not let him down.

the young French captain said regularly to visitors. He had sunk a submarine, which had taken a small, rat-like bite out of his ship's bows as she rammed it. There were a good many rat bites like that to be seen on the Clyde. That Italian liner below the Aconit had been captured. She was burned clean out like the Normandie, and they had to sink her to put the fire out. Now she was rising again, a new ship, and people keeping their mouths shut about her. The Thetis was often here. And there was the phenomenal destroyer, Tavelin, which had her bows and stern blown off simultaneously so that she kept her balance and came in, square at the ends, looking very much more like the floating section of a house than a ship.

The men who stood listening to the sailor in the shipyard knew all these things and many more. They did not know as much as they used to know before the war, when some men followed the ships they had built as you might follow the form of racehorses. That is one of the handicaps of the trade during a war. The most naturally public industry, one which certainly belonged to the general imagination, had to turn itself into a very secret one. It is extraordinary, but the people of Glasgow,

who at one time knew what every ship on the Clyde was doing, simply did not know on February 26, 1940, that the newly built Oueen Elizabeth had slipped out of John Brown's to "the tail of the bank." destroyer escort was waiting in the fog for her and did not know what ship he was getting until she appeared. Half Tyneside could point out the lovely Norwegian gunboat they called "the phantom ship," that flashed fast and white down the river and used, as they say, to "deliver The Times" at German G.H.Q. in Norway to annoy the Nazis, who could never catch her. The story of the Illustrious—some instalments of it anyway are known in Barrow and in Birkenhead where she was completed.

The seaman had come to the end of his story. One of the Works Committee thanked him. "It's up to us," he said, "to see we don't let these brave men down. We depend on them and they depend on us." It was a plain truth which needed no gesticulations and no cheers. The hands clapped. At the gates of the yard the last cigarettes were thrown away, and then the men streamed on to the empty slipways and into the deserted shops. The yard began to live. Like a machine-gun burst, the first pneumatic riveter sent off its roar, a noise enough to knock your head off, and the first limelight flash of the welder's flame came from the rust-coloured plates lying on the skids. Up the ramp at the end of the yard, scores of men were trooping on to three or four destroyers lying in the water. And like an answer to this yard, the riveters from the yards across the river rapped out their fusillade.

It was like a battle. It was a battle. Who were the men? Pick them out at random, and it is astonishing how many of them were not lifelong shipbuilders. The slump left its mark on their lives. Here is a grimacing little man in his thirties, a droll with pop eyes and strong glasses, something of a comic turn. Nineteen years out of the industry. Packed up early in 1922, in a bad year; went on the dole for nine months; worked for six years as a gardener,

which was changing one kind of open-air life ror another. But gardening fell on bad times, so he went as a packer at a toffee works, then to a baker's; was a storekeeper and handyman. There was a large, grave man sitting on the automatic punch. This convulsive machine looks like a mixture of grand piano and dentist's chair. The chair jumps up and down, and at each jump a rivet hole is struck through the thick steel plate that will presently be part of a ship's hull. This man had been fourteen years out of the industry. Soft hands had been his trouble when he came back, as it

is with all men who leave the heavy industries and then return.

There was the head of the frame-bending squad, waiting to draw the frame from the furnace. A lean, wild-looking, tight-breathing man, he had indigo specks on his face—an obvious pitman. He had been a trimmer, a builder and a crane driver. With him was a sad man who left the shipyards for the milk trade. He had been apprenticed to the shipyards and it had been waste of his time. He was thrown out. So he started a milk round, worked it up, until after years of pushing at it,

THE SHIPBUILDERS stream back to work after their dinner hour. Soon the machine-gun bursts of the pneumatic riveters will rap out. Here too the battle against the U-boat was fought.





TWO OR THREE THOUSAND OF THEM come pelting out . . . men whose skins are yellowed and greasy with the fume of industry . . . they swarm in the streets, they own the city.

Digitized by

he was selling his ten gallons of milk a day. He was called up. The end of that dream. He sold his business and came here. He thinks of one thing: getting the war over as quickly as possible and going back to the milk business. He was on his own. The slump in shipbuilding turned many energetic men into the builders of small businesses which hung together round the family.

There was a grocer who was now a foreman. He was a slight, middle-aged man who wore a scarf and an overcoat, and was sheltering from the wind. The first thing he did was to apologise for his clothes; he'd just had 'flu. The northern shipyards are swept by bitter winds, but you don't go about in a coat and muffler. He had been in the shipyards before. but when they let him down he started, like so many others, one of those small mixedgrocery businesses. He ran this business with his son. His son was called up—that was the first blow. Then he was called up himself. So now his sister was trying to run the place. " I made more money in the shop," he said, "and it was strange to me giving up everything and coming here. I want to get back. But, I will say this, shipbuilding is a man's job. You're one of thousands who are making something big."

It is impossible to appreciate fully the work the shipyard workers were doing in this war, anywhere in Britain, unless one gets into one's mind that these people were scarred by the slump. They saw famous yards close. They saw places where they had spent years of their life put up to auction. A man's sense of right and wrong, the resources of his character, are bound up with his work and the place he lives in and, like the rest of us, the shipyard worker feels he was torn up and that his roots are raw. He sees, with bewilderment, that he is caught in some world process, larger than his town or his trade; the war was He could see the necessity of part of it. building ships to win the war; he was glad of the good money that helped him to make up the arrears of the slump—the impoverished home and the spoiled chances; but he

glowered at the thought of being thrown on the scrap heap again. He certainly saw the need of producing more ships. He thought—and no man is stricter about work than the worker when he feels a sense of responsibility—that long hours slacken the pace of work. Still, he would work, and did work, long hours.

The work in a shipyard has always been uneven in its flow. The frame bender and his squad stand idle while the frame heats in the furnace; the platers are waiting for the crane to come down with the new plates. There were lulls, there were furious rushes during the war; and especially because of the submarine war, last-minute alterations—and drastic ones—had to be made to a ship. Disguises might suddenly be necessary, or new armament; work that had been painfully built up must be quickly burned down. Inexplicable delays, inexplicable rushes afflicted the shipbuilder; and it was all the more infuriating because it had always tended to be like that. New techniques come in and disorganise old ones and play the devil with conditions of labour.

You leave the workers in the din of their afternoon. And then at five o'clock—two nights a week the time was seven—the din ceased and was followed by a very different, a human roar.

You are standing outside the gates of the yard. A line of empty trams is waiting there. Squads of buses are parked in the side turnings. Presently the gates slide back, and with the roar of a football crowd the workers rush out. Two or three thousand of them come pelting out, shouting, their metalled boots clattering on the cobbles. They blacken the roads. They pack the trams and buses, men whose skins are yellowed and greasy with the fume of industry, who have been deafened by pneumatic tools, who are soaked by the sweat of the forge, who have scorched their boot tips as they drew the steel frames from the furnace, or ruined their overalls on the welding frame. They swarm in the streets, they own the city.



# Chapter 2

#### Recruits and veterans

You stand just inside the yard looking down on the roofs of the platers' shed and a destroyer in dry dock. The place presents the usual spectacle. Scores and scores of groups of men going about the place on this job or the other, like a scene in a big town. You say to the Irish policeman at the gate, " How many men work in this yard?" "About a third. Tommy Handley," he laughs. He has been laughing at a large number of jokes, most of which you cannot hear because he is very tall, for the last quarter of an hour. You are hanging about waiting to go over the Labour Training Centre to look at the people who are going to be turned into shipyard workers. As you wait, a couple of welders pass.

"Good morning. What's your job?"

"Can't you see by our clothes?"

Their brown dungarees are ragged across the middle. "Welders," a public-school voice says. He is an ex-officer, wounded and discharged after Dunkirk.

"Why did you take on this job?" you say.

"It's interesting. It's the most interesting job I've ever struck. And then, the money! I make more here than I ever made as an army officer."

"He calls it interesting," the other welder grins. He is a Tynesider.

"So it is. There's nothing more fascinating than a shipyard," said the ex-officer. "You see all the secrets of the war. How the hell did you get in past the gates?"

"Influence," you answer.

"I was going to say! They practically search you."

The Tynesider grins. "He's new," he says.

The training centre was once a skating rink. There are 800 men and girls there training for factory life. Some of them will be going into shipyards. It is the first fortnight that tests a man or woman. In that time the director can tell whether his pupil is going to fit in with factory life or not. They will get used to the noise, the hooter, the place, the order of their jobs, the monotony of them as well as the interest of them. The girls have come from shops and from domestic service. They like the isolation of factory work, no customer to pester you, no mistress to drive.

A group of girls and men—the girls mostly in yellow, blue or khaki overalls, their hair tied up in coloured handkerchiefs—are standing round a machine listening to an instructor; upstairs a batch of the brighter ones are sitting at school desks, while the instructor explains a technical design on the blackboard. They are going to be supervisors. There is an N.F.S. group who have come in to learn about the upkeep of their vehicles, and here is a group of disabled soldiers—one of them from Tobruk—learning to be welders. In three months these people reach the three-year apprentice stage: such is the claim.

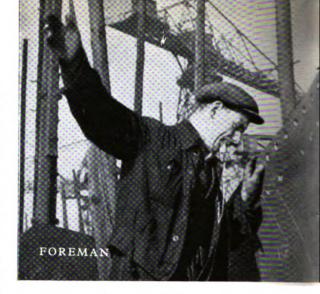
Now go back to the shipyards and ask about the workers. The management groans, the Admiralty groans. The problem of British shipbuilding during this war was the problem of every industry: labour was rationed. Skilled labour was finely rationed. One manager shrugs his shoulders with resignation at the thought of taking on more women; another is jubilant. "They're more conscientious than the men." The woman problem was

a problem for shipbuilding because it is a heavy trade and has always been a man's trade.

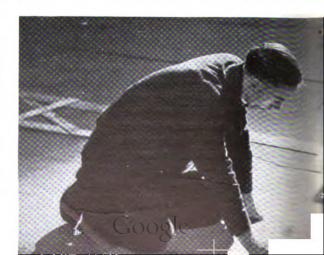
Large offices, and those industries which have employed mixed staff for years, would smile at the moodiness of the shipyards on the subject of mixed labour. Of course, the shipyards are really proud of employing women. The travelling gantry rumbles along overhead in the shed, and a man will touch your sleeve and point up to the little cage on the crane. "Girl up there. Bloody marvel, isn't it?"

But what about the regular workers, the men who have served their time, who bear the scars of the slump and have been building ships all their lives? We have seen the trades. The shipwright who lays the blocks helps to erect the bulkheads and the frame. The shipwrights set the line of the ship. There are the platers, the frame turners, the riveters and welders, the carpenters who lay off the templates or patterns, the joiners who make the modern equipment which has not yet been swallowed up by the light-metal industry. Is there a hierarchy among them? Well, a foreman plater is somebody. In the old days, the foreman plater would turn up on Monday morning in a clean pair of moleskin trousers and a bowler hat and get his squad going like There is an inherited a sergeant-major. craftsmanship, and he was filled with the pride and pedantry of his craft. He still is.

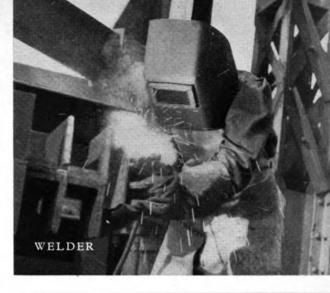
Some of these jobs run in families. You see white-haired father and middle-aged son marking off the plates; and if that son falls sick, father simply sends down the vard for his other son. It is a kind of royal command. No one disputes the father's right to send for him. Some of these men have in their pockets lists of the ships they have worked on. Some of them can say, "I must have passed the 200 mark." You feel in watching the skilled trades, indeed in watching most of the work, impressed by one fact—that these men are engaged in innumerable acts of judgment. Judging how far the crane hook must descend. where to stand the plate or bolt the frame and so on. They have the absorption of makers

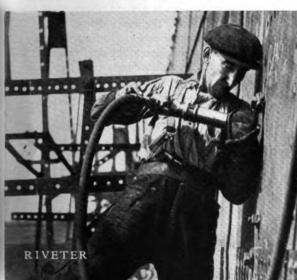


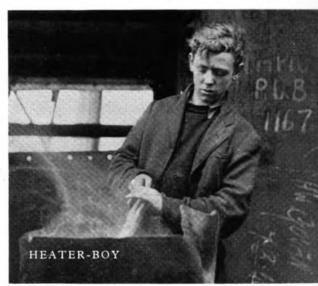
















who have had to learn to make together.

In so much of the work outside of industry a man or woman works on his own. He serves the customer, he drives the lorry, he signals the train, he writes the figures in the ledger and drives the tractor and makes the contract. in a kind of solitude, and does not need the presence of others. Not so in industry. Here the unit is not the man, but the gang or squad, or the man and his mate. Even the man who dictates a letter to his secretary is not so dependent on her as the man in the factory is on his group, on its silent working rhythm, on its timing and understanding: the glance of an eye or the movement of the hand or finger has a meaning that is understood at once and also implies experience and reliance. laugh incredulously when you see two men swinging on a plank over the ship's side, fifty feet above the concrete bottom of a dry dock, while one punches back rivets with a

sledge-hammer and brings it down twenty times within a few inches of the hand of the man who is holding the set.

These partnerships are so silent. inhuman noises drive out the possibility of human talk, and in that human silence judgment is refined and understanding has no hitch. The essentials of a man's character come out in many physical actions; much of the apathy, which observers think they detect on the faces of men working in this way, is really something else—a sinking and absence of the self, a merging in the rhythm of the job and, to judge by the shrewdness of comments you hear afterwards, a continual rumination on the character of the people you are working with, and of the other groups who are in contact with your own. The fast man, the slow man, the difficult man, the tricky man, the careless man, the patient man—one is in a kind of industrial Pilgrim's Progress.

MASTERS OF THEIR CRAFT



# Chapter 3

## The shipyards turn to war

It would take months to visit all the shipyards in Britain. It would mean not only going mile after mile along the packed banks of the Clyde and the Tyne, down the crammed ravine of the Wear; one would also spend days in the fume of the Tees, in the fog of Birkenhead, the smoke of Barrow. One would have to take the plane to Belfast. This would be simply the beginning. For there are the yards of the Scottish coast and the English Channel, the dozens of places on the estuaries and rivers where small pleasure craft were built before the war. There are those inland factories where small ships and barges are made in sections. Everywhere ships and boats could be built they were built. The war programme stretched from the motor torpedo boat to the aircraft carrier, from the tank landing barge and the wooden minesweepers to the tanker and fast cargo liner.

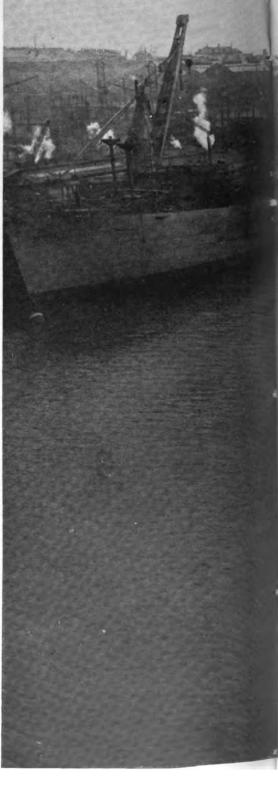
Let us begin with the Tyne. In the train going north you study a number of shiny industrial documents, and at Darlington you pick up the first hint in the grey evening light. Your eye catches sight of a small engine chuffing out of a steel works, and drawing a little truck. On the truck is a gleaming vermilion block which looks like red nougat; it is a block of red-hot steel. You have seen the Durham mines, you have seen the hoppers of ore and the long wagons of steel. You are in the coal and steel country of heavy goods trains with powerful engines that clank slowly as they draw their interminable loads along the branch lines between Middlesbrough and Northumberland. Men are building ships on the steep banks of the narrow rivers of this coast because the iron ore and the coal are near. They are the most awkward and difficult sites for shipbuilding in the world; but iron and coal have decided their position. The slipways, you notice, have had to be laid at an angle to the stream, for there is seldom room enough for a right-angle launch. From these places is launched a large proportion of the world's tonnage, a very great variety of specialised ships.

The coldest wind in England blows into the north-east coast and sweeps the shipyards. Listen to it bouncing off the windows of the buses and the trams on their journeys from town to town. For the Tyne is a string of towns, thrown over the steep hills and linked by waste land, red brick slums (blitzed first by the slump of 1931-33, and then by the Germans), and by pink housing estates with miles of shrubbery. On these buses you sit among experts. They are workers, all of them; not a man of wealth or leisure among them. Every one knows the yards. Your neighbour might be the gas man, the baker, a soldier on leave, or a shop worker or a miner; but ask him when this ship or that was launched, tell him you think welding is the coming thing, or try him on Russian icebreakers and the speeds of destroyers, and he can flood you with facts and sink you with judgments. All the people on the bus can tell you about the shipbuilding firms, who is the brains of this business, who is the misfortune of the other, where this yard went right and where it went The family history, the births, wrong. marriages, deaths and investments of the shipbuilders come under the same scrutiny as their work. Not a success, not a scandal escapes. This industry belongs to Tyneside intimately. Not a good man and not a bad man but is known inside out

It is not long on the north-east coast before you get into an argument about the merits of the English and American methods of building. If the rapid production of ships is what is wanted during war, why not copy the Americans, the masters of mass production? There is no British shipbuilder who does not admire the American effort, even though the notion of throwing a ship together as you would a car makes the heart of oak groan. The American system is the conveyorbelt system. You choose the site, you build your ideal shipyard. You choose your single type of ship, you stamp out the parts and weld them beside the slipway—some of the sections weigh up to 50 tons-you put the machinery in before she is launched (which is the American habit, and desirable where the welded ship is concerned).

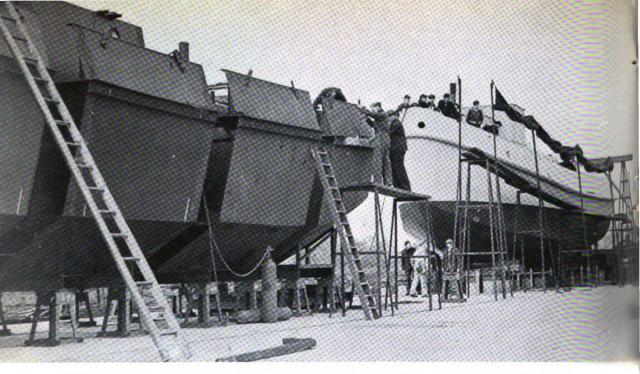
But look at the enormous difference between the British and American conditions. Remember, incidentally, that the first Liberty ship, the prototype Britain gave to the Americans, was built on the Wear. Remember, too, in hearing the now notorious arguments and wrangles between welders and riveters, that Britain has a big lead over the Americans in hand-welding. And now look at the two industries. British shipbuilding yards found themselves in the front line of a country at war when, even if it had been possible, it certainly was not desirable to waste time reorganising the industry from top to bottom. There was neither time nor labour for that. The Americans had the fullest choice of land and labour. There were nearly twelve million unemployed to choose from. There was no scramble for waterfront as there is bound to be on the English rivers. Above all, in America, rival war industries were not taking away the manpower.

What the British builder had to consider, when he was tempted by out-and-out welding and prefabrication, was the fact that welding





ON THE NARROW RIVERS of the north-east coast, the slipways are laid at an acute angle to the stream: there is no room for right-angle launches. Yet from these crowded shipyards goes out a considerable proportion of the world's tonnage.



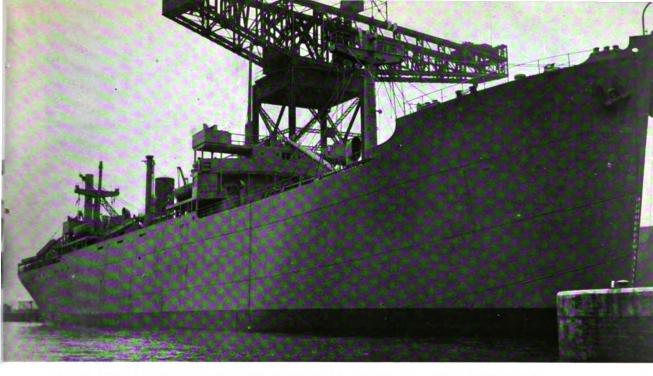
PREFABRICATED TUG being put together, section by section, like a child's constructional toy.

saved steel but used more labour. Which did he want to save? Labour, of course, under our conditions. He had riveters ready; but he knew that, since his labour was more and more diluted, it would be easier for him to weld, since you can train welders in a few months—youths and young women make excellent welders—whereas it is far harder to train good riveters and they have, as a rule, to be men.

What the British shipbuilder did was to compromise. The fancy lines went. In the drawing offices you were shown how the number of straight plates—quicker to make than the curved ones—had been increased in ship after ship. You saw them mixing welding and riveting; you saw them marrying the traditional method of construction with various degrees of prefabrication. Prefabrication means that certain parts of the hull of the ship, parts which may weigh a few pounds or a few tons, are welded or riveted together on the ground beside the ship, or in some factory elsewhere, and they are then assembled in the shipyard by the waterside

Whereas, by the traditional technique of shipbuilding, where riveting is mainly employed, the parts are fitted one by one to the ship.

war shipping the companies indicated to the builder the kind of ship they In the light of the information furnished by the owner, the builder's drawing offices worked out the design. They experimented with models to determine the relation between engines and hull design. When the industry became organised for total war, design was stripped of its individual fancies and the Admiralty, in consultation with the Ministry of War Transport, determined what designs were best suited to fulfil wartime requirements. In fact, like people, ships were requisitioned, their equipment was rationed, and their jobs in most cases were very different from the ones they did in peace time. The shipyard designer had to consider cargo and speed in relation to the war at sea. Ministry of War Transport told the Admiralty which losses most urgently needed to be replaced, and the Admiralty, in turn, deter-



MASS-PRODUCED MERCHANTMAN. Practically the whole of it was made at inland factories.

mined which yards were most suited to build the various types of merchant ships needed.

A similar attention was paid to the size and materials used in the building of the ship Steel had to be saved. Hence the attraction of welding, which saves an inch or so overlap on every plate. A few hundred inches make quite a respectable difference to tonnage. Then the wooden deck went; light metals and plastics took the place of wood in the ship's fittings—in the cupboards, tables, wardrobes, lockers, etc. Paint is a costly part of shipbuilding; the three or four coats of peace time paint were cut to one or two. Three coats were exceptional and the paint had not its pre-war constitution. The upper masts went and the high funnel—they gave away a ship's course to U-boats.

In outline the ship was simpler; but in detail it was often more complex. There was more gear at the main hatchways, for in wartime a ship may have to unload her own cargo. Blackout had come in: it was far stricter on sea than on land, and also more tiresome. But holystoning had gone. A mixer,

which looks as though it is mixing chocolate, makes the composition that went down on the deck. No longer did you catch the smell of oakum or hear the tap of the wooden mallet as the shipwright caulked the wood deck. But, against these losses, you saw things like the asphalted armour of the bridge and gun emplacements—the asphalt is poured in between two sheets of steel and is an excellent protection against bullets and splinters. And there was a whole new mythology of secret instruments.

Those were the chief changes one saw in a ship. There were some changes in the engine room, too. The boilers, and main engines and auxiliaries, had in many cases been standardised, and they were built not only by marine engineering firms whose names are famous, but by firms who had never touched marine work before. Simplicity, if it could be achieved without sacrifice of efficiency and safety (for a vessel with a limping or stopped engine was like a lame animal, at the mercy of the marauder), was the object of the marine engineer and the builder.

## Chapter 4

#### From drawing board to platers' shed

A ship begins its life in the drawing office. After the dust, the cold wind and racket of the shipyard, the drawing office is quiet and warm. In the high, light room, the air is almost aromatic with the smells of polished wood, pencil sharpenings, tracing paper and Indian The gold-rimmed spectacles of the ink. draughtsmen catch the light as their heads The silence is studious. It is broken only by the discreet step of shoes on the linoleum or the soft swish of the tracing paper as clean hands roll it back and weight it down with the heavy, round rulers. draughtsmen rarely look up when the stranger comes into a room, and you do not catch them nodding at each other as the men in the yard do, when you go out. Most of these men in the drawing offices come from the secondary schools; some of them get firsthand experience in the yard; the ones who will have executive jobs later on have probably gone to the university in the winter months, to get their B.Sc. in naval architecture, and work in the drawing office in the summer.

There are not just one or two plans of a ship. There are hundreds. There may be thirteen or fourteen thousand plates and bars, a million rivets. Here is the plan of the frames, here the plan of the bulkheads. This one shows a weird cross-section. This one refers to the holds or the stern. And then you may see some rudimentary ship's model, made to scale, which has been constructed to test the lift of winches or the effect of certain weights. Here, too, you may see a model of the launching trigger.

From the drawing office the plans go to the

mould loft. You go out of the drawing office and up the stairs in some building of the yard and again you come into quietness. enormous floor lies before you. It is like a skating rink with joiners' benches round the sides instead of seats. The wooden floor may be half the size of a ship, and a group of men in brown dustcoats, kneeling in the middle of that floor and tacking laths of wood together, look small and lost. As you walk across the floor, you notice that a fine pattern of curving chalk lines, made in thin hard chalk, is drawn on the floor. If you stand in the right position, you will see that these lines follow the curve of the hull, so that whatever plate or frame is needed on the ship, you will be able to walk across the floor to the precise spot and see its shape and work out its measurement. From the diagrams on the floor the carpenters are making full-scale patterns or templates of all the peculiar plates and frames of the ship's hull.

From this point shipbuilding leaves the quietness and spaciousness of theory for the muscular contention of practice. It passes from the clean hands to the dirty hands. First there is the forge. It is a building apart, and here the tools of the shipyard are made—things like the teeth of the punches which are driven through the plates, and all manner of shafts. There is this forge, and the lighter forge of the plumbers where they bend the lead and copper pipes like snakes.

In the main forge there are thirty or forty blacksmiths. The shed is dark. Each man stands before his hooded fire, his face smoky and reddened by the flame and glistening with





HOW IT BEGINS. In the drawing-office, a high, light, silent room, plans and models are prepared. Templates, full-scale wooden patterns of the ship's plates and frames, are then fashioned in the mould loft.



"LIKE SOME PROFANE CATHEDRAL, dim, solemn and portentous," is the platers' shed, where the platers' squad and the framebenders shape out in metal the template designs for the ship's hully

ber





PLATERS WORKING. The one-man punch, with its jolting, bucking chair, punches rivet holes in the plate, which is then trimmed to exact size by a shearing machine that runs metal like cardboard.



"IT IS LIKE KILLING A SNAKE." Darting in and out with their hammers, they set to shape the red-hot bar that is to become one of the ship's frames, or "ribs."

Digitized by Google

sweat. This is one of the muscular, skilful and genial trades. The sweat pours out, the beer has to pour in—even at the present price, which hits the blacksmith hard. The masters of the craft often run to fat. The sound of each trade in a ship has its special quality the riveter's and caulker's fusillade, the plater's solemn clang, and the elephantine thumping of the forge. These steel hammers, that come down like tree trunks on the anvil. shake the earth and the building and thicken the air with a cloud of reverberations. One is surprised that the foundations of the world can stand up to such a tonnage of blows in the belly. There are craftsmen here who have been forty years at the job, and their fathers before them; cunning men who will temper steel till it reaches the right degree of blue as if they were magicians.

Watch one of the master smiths at work. He and three helpers and a boy are there, waiting for a shaft to heat. They do not speak. They stand relaxed, gazing at the fire, each forming his opinion of the right moment to draw the shaft out. Even the boy who sits on a perch behind the hood of the fire, and whose job it is to pull the lever back and forth and release the enormous stamping foot of the hydraulic hammer, has an alert eye on the smith. This is the boy's first job. months ago he was thirteen and at school. The smith, wide and fat in his apron, wipes his hands on a rag and picks up his tongs. The three men crouch and lift the shaftwhich is about twenty feet long and the size of a half-grown tree trunk—by a grip arranged like a double wheel so that they can turn the load. A wall of solid heat moves forward and leans flat against you, and down comes the earth-shaking hammer, squeezing an inch off the thickness of the shaft like toffee.

As the smith directs the turns, his helpers crouch like wrestlers. They grapple and strain with the end of the shaft, their watchful eyes missing none of the smith's movements. It is majestic, smooth. Now and then the smith sprinkles a little water, like a baptism on the shaft, and adds an element of devilry and

magic. It is a very ancient trade and yet, as you go, you notice a strange and beautiful modern aspect of it. Working at a lighter job before another fire stand a young man and girl, the girl with her hand on the lever, the man with the tongs in his, like some new Adam and Eve with the fire reddening their faces, standing in the silence of their work. It is the silence of people in the noise of these yards which you think of afterwards.

The forge is common to many industries, but when you go to the platers' shed you are in a place which belongs to the shipyard alone. It is like going from a fiery twilight into the wide, dim grey of a long evening. You step across the cobbles and the light-railway or crane tracks, through an entrance that can take half a dozen lorries or more, and you enter a building of cathedral size, dim, solemn and portentous. The impression that one has entered some profane cathedral grows as one walks down the wide aisles between the great black machines that dwarf the people working at them, as one looks at the bare brick walls and the high windows which have been darkened since the war by blue paint. When the welders tip back their masks or helmets they look like nuns or knights, and reveal that medieval aspect of modern industry which is confirmed by the sight of collective

Not individual people, but groups or gangs of people are important here; the individual is least, the group alone seems to have personality. And then, the sounds. There is no continuous racket of little machines. This diabolical religion is expressed in sounds more measured and portentous. There are great and sudden clangs, an intoned mutter runs between the greater noises, and there are bell-like, gong-like crashes which astound the ear and the mind. You feel you may be watching a rite devoted to the creation of the ship which belongs naturally—before anyone else—to these votaries who are building her. Human hands have touched every inch of that dour shell and given to their work an unconscious meaning.

When the "green" plates are brought by the railway from the steel works to the ship-yard, they have been cut approximately to the right sizes. But many will have to be cut down, trimmed; many of them will have to be given the curve of the ship's bows or the stern. So they go to the platers' squad. The platers form one of the main trades of the industry; a foreman plater is a great man, a king with his own entourage. The size of the platers' squad varies from yard to yard, but it is common to find a squad of twenty or more platers' helpers working together and keeping the flow of plates going from the shop to the hull

The platers whistle up to the girl in the little box of the crane which travels overhead quietly from one end of the vast shed to the other. It rolls slowly across the roof towards them. Down comes the chain; by instinct the men whistle—the girl cannot hear it in the rumble of the shed—but she sees a hand go up as well. One finger for stop, two fingers for go. You see a man, with a pot of paint, laying the wooden template or pattern on the plate and marking the rivet holes. Once more the hook of the crane comes down and the plate is carried to the one-man punch, which grips the plate, rolls it along and punches the holes in, while the one man sits in his epileptic chair above the machine, pulling and releasing the lever. Or perhaps the plate goes to one of those long machines which drill four or five plates at a time, while a man watches the steel shavings corkscrew out of the hole—all he has to do is to water the drill and keep it cool. There will also be a countersinking machine which bevels the holes; and then the steel plate is picked up in its sling of chain and carried to the shearing machine, which will cut its edge like cardboard.

But perhaps a curved plate is wanted, with a kind of leaf curl in it. If this is so, it goes over to the furnace and there it is made red hot in the ovens. There are large wide ovens for the plates, and long narrow ones for the frame. There is silence near the furnace, except for the faint tick of burning coke, as the gang of plate or frame benders wait for the steel to be at the proper heat. They stand there, a gang of half a dozen men, waiting with their sledge-hammers—once in a while you will see a hefty-looking woman. floor is an area of iron grating, and the men have fixed the cradle over which the plate is to be bent. This is a job of muscle, dexterity, incredible speed and skill. For they must strike while the iron is hot; they are racing the dying heat, and every blow must be in the right place so that the plate does not rise too much here or stiffen there. You were standing at the far end of the platers' shed when. suddenly, above the mutter and banging of the punches, you heard a noise like the crash of a gong, like the beating of a barbarian's bell. That was the sound of the plate being struck to its shape, steel on steel, when it was drawn from the furnace

A less sonorous cry comes from the frame benders, the men who bend the ribs of the ship, but here the sight is more animated:

"Is there a frame coming out?"

The head of the squad opens the oven door. A tongue of heat leaps out and you stand back, a good six or seven yards clear, as your hurt eyes look for a second down the low corridor of fire where the frame is quivering.

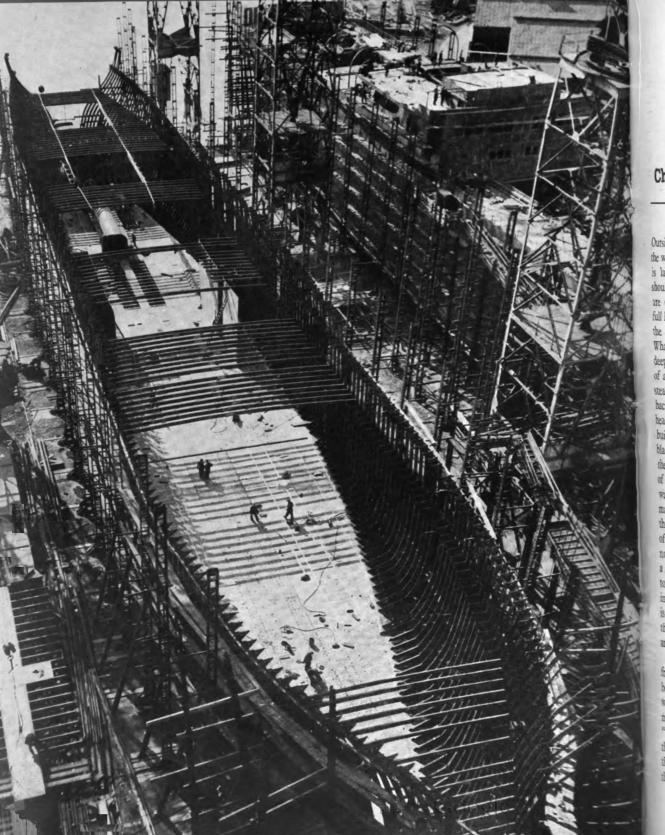
"There'll be one out in about two minutes." On the grating where you stand—it is a grating of holes, not bars, and a good twenty vards square—the gang have fixed the curved steel pattern to which they will bend the frame. Near it are right-angle brackets—"dogs," they call them-which will be picked up by pliers and dropped into the holes and over the frame in order to hold it tightly down. The two minutes are up. A nod from the leader of the gang, and a man opens the door of the bar furnace again. Two men pick up the end of the frame in their tongs and slide it swiftly out. It slithers out almost soundlessly, a straight, flashing, almost transparent ruby bar twenty or thirty feet long. They skate it over to the set-iron or pattern. Two of them slip the brackets over. The others lift their hammers and strike. In the midst of them is a man who has wheeled an hydraulic punch against the frame and squeezes it softly to the bar, while all round him the squad dance like boxers, picking out the dog or bracket from this hole, slipping it into another, while the hammers fly at it, and the straight bar is now a grey curve with the ashy flake of steel scale breaking off it. It is like killing a snake. And now the frame is a simple curve, a flattened "S"; or, when they are making the frames of a submarine's hull, it is almost a circle.

One watches the feet of these men, the way they dance round the metal, almost touching it with their boot tips (sometimes they do touch it, which is not good for their coupons). One notices how each man knows which bracket to loosen and which to tighten, and when to slip back for a new one, and when to come in with those final blows that keep the end of the frame from buckling and rising. In a minute or two their frenzy is over. Six men stand there panting, their chests and faces drenched in sweat, their wet hair hanging on their foreheads. A frame bender may make f 10 or f 11 a week, but he is commonly paid by contract. A lump sum is agreed upon by the gang for making all the frames of a ship, and the men can draw on this sum as they want it. "I remember," said a Scottish plater, thinking of the ships he had worked on and of the horrible follies of mankind, "the what was it?—I forget her name. Anyway, ships are numbers to us, not names. We'd a week's work to go, and when I went to the office to draw the money, we found we'd made a miscalculation and had drawn all the money already." His laugh was macabre.

These are the main jobs of the shed where the grey cathedral mist rises between the machines. When prefabrication is being employed, you see the hydraulic riveting machine at work in the shed; it is a cousin to the one-man punch. The hydraulic riveter is like a beast with a large pair of lobster claws protruding from it. The plate is wheeled on a trolley and passes between the claws. The riveters' fire travels with it. Four or five red-hot rivets are thrown on the plate and the claws come down and squeeze them into the holes. And no platers' shed is without the welder's flame. Its lilac electric flash distorts the faces of the men and women. and sets nervous triangles of light twitching and jumping over the machines and the wall.

THE LOBSTER CLAWS of the hydraulic riveter, a machine used on prefabricated work





# The ship takes shape

Outside in the yard the shipwrights are laying the wood blocks on which the keel of the ship is laid. These wooden strong-points are shoulder high when you stand by them. They are criss-crossed like a child's bricks, and a full line of them from bows to stern will take the whole weight of the ship as she rises. What is a ship's keel? It is not one of those deep fin-like blades which shape the bottom of a yacht and which are there to give her steadiness. A keel is the back rather than the backbone of a ship. When you duck your head and walk underneath a ship that is being built, you are stooping under a low, flat, black ceiling of riveted steel which is kept off the ground by the blocks and by phalanxes You have the impression of of pit props. walking down the galley of a coal mine. You may think of the keel as the ground floor of the ship, but in shipyards you must be careful of words. To the shipbuilder the floor means not the flat surface but those plates, each with a manhole in them, which are fixed vertically to the flat surface and help to make the box in the double bottom. The bottom of the ship is really several rows of narrow chambers, and they are, indeed, often used for carrying oil and water ballast.

After the bottom of the ship is laid, the frames (or what the layman calls the "ribs") begin to rise: within them are built the great walls of the bulk-heads or watertight compartments. The plates or walls of the hull are "hung up" on the ribs. The crane picks up these plates from the platers' shed and carries them to the slipway. By now, you see that thick stockade of steel or wooden posts which

rises round the hull. At the bottom of it, the supporting props are prodding into the side of the vessel, taking the enormous strain short props close under, long ones further out—and over this maze of scaffolding rise the tall steel carriages of the cranes which preside like fantastic birds over the work. It is common to see a circle of these high, stork-like structures, with their long-necked jibs slowly turning over the ship, while the chain dribbles down to pick up the plates from the gang of men below, who are struggling with a swinging sheet of steel which may be ten or forty feet long and many feet "Hanging up," though it is an wide. expression which suggests the lighter art of the wallpaper hanger, is a good phrase. The plate goes up into the sky and then is lowered to its place in the ship's side. A whistle blows, and it is temporarily held fast by nuts and bolts, waiting for the riveter. Or, if part of the hull is welded, then the plates are lifted in sections of many tons each to be tack-welded before the final welding is done.

That is the job as you see it on the slipway before the launch. Three thousand tons of steel, yellow as gravel, slopes to the water, held there by catches not much larger than a man's hand: (there were 40,000 tons of the Queen Elizabeth and six eight-inch triggers held her huge weight in place).

If the platers' shed suggested a medieval rite, the shipyard itself suggests a medieval city, self-contained and animated by a large number of independent trades. You are struck by the number of people walking about, apparently at random, but going on from one



THE GIANT'S RIBS. On these frames the plates are "hung up" to build the hull of the ship.

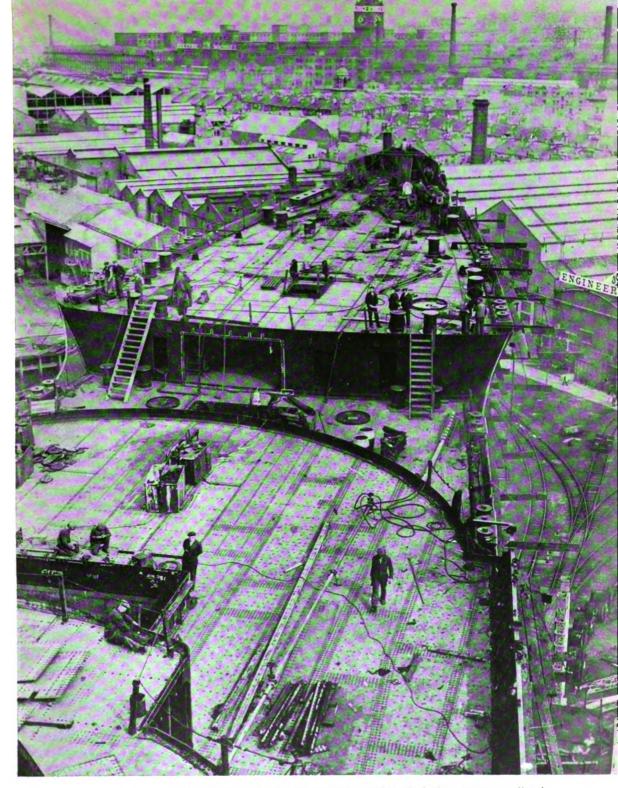
iob to another. Everywhere you see little groups of men or girls, to all appearance detached from any contact with the rest, huddled round some special job. welders, older men than the general run, who are doing the upright welding and not the easy welding on the flat, are working on a collection of conning towers for submarines. Stuck down there, the conning towers look like enormous pepper pots. These two flourwhitened youths stirring that white powder and paste are mixing the insulating material that will go on the walls of destroyers; those others are loading up the asphalt that goes into the anti-aircraft armour. This group following the crane are taking what is called the "coffin" plate to the new tanker. Those girls are going on to a launched ship with their paint pots.

You hear a whistle from somewhere in the belly of the ship, and the plate with its lace of holes at the edges is stopped in its descent and men seize it to bolt it into place. Those bolts have to come out when the riveter gets to

work, and a woman has got a wrench on them. The riveter is a man who will work anywhere on a ship. He may be sitting with his legs dangling from a plank behind the mesh of scaffolding on the ship's side. He may be down in the darkness, that dead steel darkness of 'tween decks, which hangs in a ship when it is just a collection of rusted steel boxes stacked together, before the paint has lightened and civilised it. He may be working on the high, wide flight deck of an aircraft carrier, on the giddy projection of its gun emplacements, on its bridge that rises like a tin hotel on one side amidships. The wind can blow pretty well strong enough across the shelterless deck to blow a man down. The riveter, like the welder, may have to go down inside the oil tanks of a tanker, where he will work with his lamp and his fan in the fumes. and you wonder that there is room for the man and the noise together inside that cistern.

The riveter is a member of the "black squad"—a gang of four who turn up to the job with the misleading nonchalance of a family of jugglers. They are the riveter, the holder-up, the heater, and a boy. A speechless quartet, or almost speechless: "Where's that boy?" is about their only sentence. The "black squad" can set up shop anywhere and begin performing their hot-chestnut act. You see one swung over the ship's side. He stands on his plank waiting with pneumatic instrument in his gloved hands On the other side of the plate, inside the ship, is the heater with his smoking brazier—a blue coke haze is always rising over a ship: he plucks a rivet out of the fire with his tongs, a "boy" (nowadays it is often a girl in dungarees) catches the rivet in another pair of tongs and steps quickly with it to the holder-up, who puts it through the proper holes at the junction of the plates. As the pink nub of the rivet comes through, the pneumatic striker comes down on it, roaring out blows at the rate of about 700 hits a minute, and squeezes it flat.

One of the curiosities of the ship's side-



HER BOWS TOWER above the town, her deck "suggests a medieval city" with groups of people working independently or walking from one job to another. A pre-war photograph of the Queen Mary.

it is also one of those accidental beauties of line which are sought by modern artists—is the white chalk mark which the rivet counter ticks across each rivet, showing how many the riveter has done in the shift. One sees half a dozen plates cross-hatched in this way by the errant human touch, and a list of figures like a darts score is totted up beside them. Paid by the hundred, the riveter is keeping his accounts. He will average up to thirty-seven in an hour.

And now the ship has its walls and its holds: it is on the way to being decked, except for that great cavern into which the engines and boilers are to be lowered. The noise of building reaches a note and volume which are unimaginable. From the distance it sounds like a thick gale of wind in a forest; in the yard itself, as the riveters' sparks dribble down from the ship's side, you seem to have got into a hot corner of a gunman's skirmish. In the yard you could hear if you shouted. Here your shouts are knocked clean out. You have to dodge around a corner and hope one word in six will reach the ear that is leaned towards you. The roar comes from above, below and on either side of you—a pandemonium of clangings, rappings and

sawn-off-gun work, with men making rival roars in an alley-way a yard wide, that at first causes terror as you grope through the darkness. Hundreds of men seem to be lying, kneeling, crouching, crawling about. Here is a group of men chipping the top of an airtight oil hatch. Those stage-lighting flashes are the eternal welders, the boys. For the caulkers are at work, easing up the edges of the plates to the rivet heads, to make the ship watertight and sound. You step over their heads and legs. Once in a while a face which has gone beyond indignation and resignation into a world of its own looks up from the level of your knees. It is the face of some caulker coming up for air after twenty people in boots that are not light have stepped over him as he worked.

You look down into the body of the ship, through the smoke haze of the riveters' fires, and watch the men step about there like little demons in the galleries of Dante's hell. It is like looking down the side of a bombed-out house, each storey naked and revealed. And in all this shindy and rusty disorder you see one of the most extraordinary sights of the shipyard, the first sign of civilisation—a woman in overalls, sweeping up!

ON THE OTHER SIDE OF THE PLATE, inside the ship, are the heaters with their smoking braziers, plucking the rivets out of the fire.



#### The ship is born

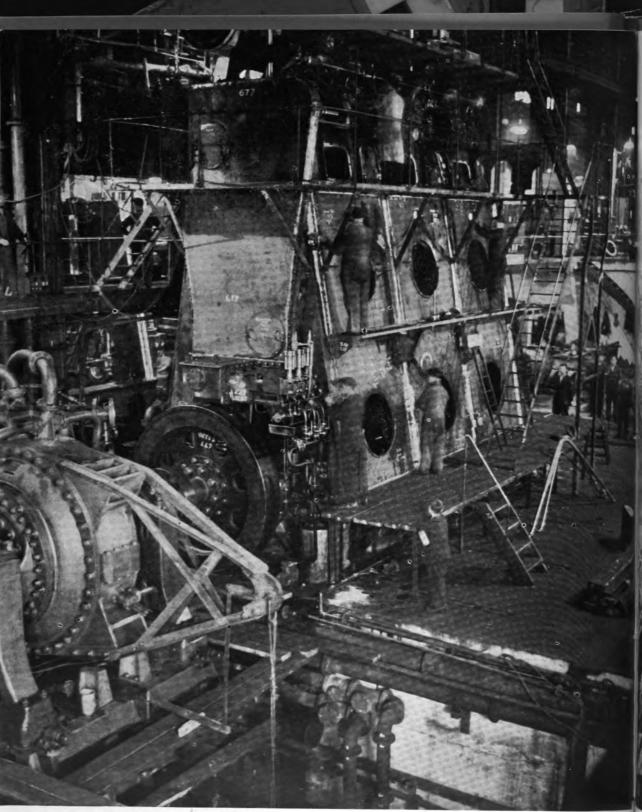
Now, underneath the ship, under that low black mine-like ceiling with its corridors of pit props, where the ground is littered with wood chips and where you are glad of a bowler hat to take the crack of a beam you did not see, the men are preparing for the launching. Two more rows of blocks have been built on either side of the row that held the centre keel, and on these blocks are the launching ways. They are really a wide pair of wooden, scenic-railway tracks on which another pair of tracks called sliding ways, are resting. Thick yellow grease is melted and poured between them. At the fore-end and after-end of this track are the launching triggers.

Their mechanism is very much like that of the trigger of a gun, and when it is released -that is to say, when the men have knocked away the props-that small finger of wood comes down, and out slides the ship on its journey. At the side of the launching ways you will notice heavy coils of rusty chain, a pile of it looking like guts; they have not been dropped there by accident. They are used to brake the ship when she goes off into the water. Remember, she has no engine in her. She is light and free. The naval architects have had to calculate the strength of the tide, the ships' weight and speed, the angle of the launch in regard to the width of the river; and when they have made this calculation they know how much chain she must drag, like the brake of a balloon, to check her at the right point in the river. Otherwise she might hit the opposite bank. She moves out slowly, momentously, to the plunge, and in the water glittering against her wide hull a mess of debris has gathered round about. This is not the rubbish of the river, but the blocks of the sliding ways which she has taken down with her, which are held together by wire and will presently be fished inshore again. A ship has been born and looking as plain, blind and unhopeful as any new-born thing. Those blocks are a sort of afterbirth. The tugs, like midwives, come along and take her down to the marine engineering works to get her boilers and her first feed of oil.

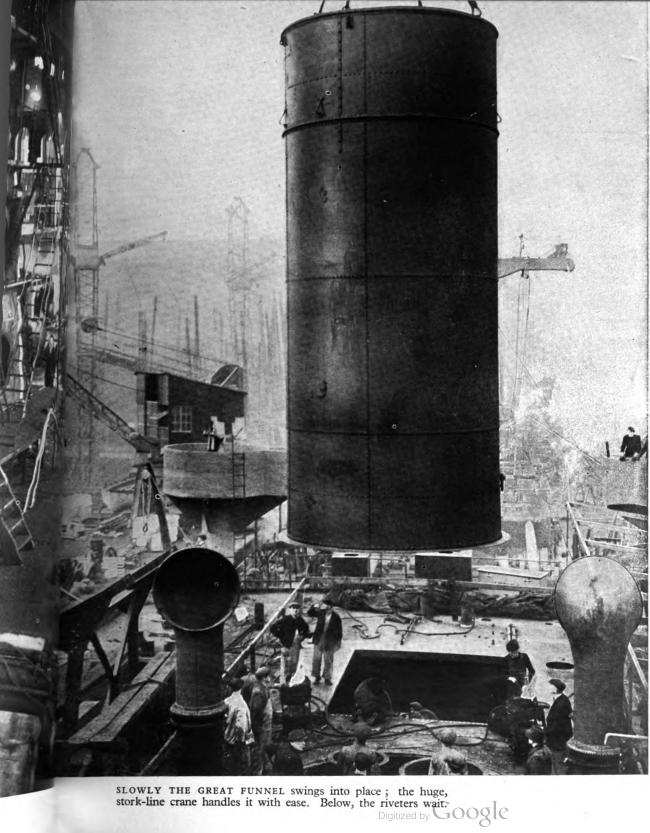
"She's gone down for her engines." Stand at the water's edge and gaze down the river, which looks like a busy street in the smoky sunlight. She is tied up, with two destroyers and a tanker, at the fitting-out wharf. You can pick out the Works on the skyline, by the huge black cranes, like a heavy letter "L" printed upside down, which dominate all the shipbuilding rivers. These cranes are the house sign of a new industry it is more than a hundred years old-which has become attached to the ancient trade of building ships. The Diesels and the turbines, and all the auxiliary machines which make a ship live and drive it, are made in the enormous halls of these Works. On the floor the new engines rise. They look like crude cathedral organs, with youths and men climbing over them to fit and to weld; and sometimes the machines which go to make the engines are larger than the engines themselves. To the stranger, walking down these crowded alleys, between one hissing giant and the next, and finding his way among the scores of preoccupied men who serve them.







"she's gone down for her engines." A huge Diesely Google engine, three stories high, dwarfs the men who put her under test.







IN A LAST-MINUTE HUSTLE, while the new ship lies at the fitting-out wharf, guns are hoisted aboard, welders flicker over the gun platforms. She is almost ready.

it is like a terrifying and powerful city enclosed unapproachably in its own din. Here are ten or twelve boilers. That young man with the shaggy black hair and sweatsilvered chest picks up his sledge-hammer and lays on with twenty alarming blows; then grins sardonically at your boot heels.

Further on, four men are turning a boiler top slowly round. One side of it is as red as a raspberry and almost as soft; the hydraulic press is coming against it and squeezing the red-hot metal. They are flanging the boiler. Then it is bored. Farther on again, you see a team of men bringing their hammers down on it and filling the hall with a sound like the peal of Big Ben. The riveter's boy, waiting for the next rivet in his fire, is playing about with the tongs and pulls an imaginary tail from the foreman when his back is turned. There is only one quiet place, a huge floor, cool and damp, where at first sight dozens of men and women appear to be gardening. They are really ramming the black wet sand round the cores of the moulds which lie in

rows of boxes on the floor. At the end of the hall women joiners are constructing the wooden cores. And out of the work of all these people come the castings which go into the most famous marine engines in the world.

The business of the British marine engineer during the war was influenced by three main things: the need to produce a large number of engines which must be absolutely reliable; the need for simple designs which could be handled by sea-going engineers of short experience, for there had been heavy casualties among the skilled; and the need to produce faster cargo ships. When war started, we had to introduce high power to cargo liners by the adoption of geared turbines—an arrangement which effects a great saving in weight. These geared turbines, taking steam from water-tube boilers, had been used in general only in warships and high-class passenger liners; later, because of the saving in weight and the economy of materials, these engines went into a large number of the vessels engaged in the Battle of the Atlantic.

In the evening you can go down to a small workmen's club. Most of the men there have been home and have got out of their overalls. but there are a couple here with faces comically greasy and dirty, a Laurel and Hardy pair, sitting alone with vacant smiles on their faces and a glass of stout each before them. There are numbers of small trades in a shipand the life work of these two men is to be on the ship when it is launched. They are shy, obscure men who watch the guiding wires, hand over to the tugs, and will go out anywhere up the coast with an unballasted hull that gets lively in a rough sea. On a job like a launch the men are all on the morbid look-out for something queer and unpropitious. "Did you feel her roll this afternoon when she was half-way down?" says "Aye," says Hardy, Laurel to Hardy. "something queer there—that roll in the launching. And in the way her 'arse'"shipyard technicality — "rose when she floated."

The most exciting moment in a ship's life is a week or two, or a day or two, before she is finished. If she is a naval vessel the commander comes down every day to see her and lunches with the firm. He is engaged in what the Navy calls "building the ship." "I remember," he says, "when I was building my last ship at So-and-so's." The shipyard managers, architects, engineers and so on, raise an eyebrow. "Who built this ship?" they silently inquire. "You or the shipyard?" It is a manner of speaking. "Building the ship" means overseeing these last few weeks. Merchant seamen do not use the phrase. But you see the excitement of the job in its finished stage, the beginnings of the commander's passion for his ship, the daily growth of ardour for it. "That's a useful gadget. I remember I was coming down from Iceland last winter in a terrible hurry . . . . " This is a good moment for the workers, for they sometimes get to know the oncoming crew and they suddenly get an impression of the thing they are doing. A few get caught by a fever for the sea; though most are like teetotal brewers—they will build the things, but would see themselves dead before they went on anything so dangerous. Submarines, strangely enough, seem to have a strong power of attracting the young worker. It is natural. Anyone who has worked on the wiring inside those electric herrings is bound to get the feeling that he must go out in one. A submarine flatters human intelligence in a superlative degree. It is a brilliant, sinister brainwave, a shaft of sheer intellectual satisfaction. It is like living inside a brain.

Then, these finished ships have got their paint. Too long one has looked at that gravelcoloured steel, the sight of which sets the teeth on edge. Civilisation is being laid on by girls-who get a good deal of it on themselves; the decks are being stirred up like chocolate in the mixer and laid on in paste. There are no timber decks now-and good riddance, a destroyer captain will tell you. Pneumatic tubing infests the place like snakes. Scores of people are still at work. They are painting, wiring, welding, plumbing, caulking, all in one room. And one of the ship's officers has got on board and is letting his wife peep through the porthole at the bunks which have been fitted in one corner.

The engine is murmuring below. There is the hot smell of new oil and of new machinery working. The Admiralty surveyor is down Perhaps she is a "mystery ship." Once she was to be a plain merchant vessel of 10,000 tons with peculiar holds and abundant armament. She has been suddenly altered by Admiralty orders—one of those sudden changes which bewilder the workers. Where is she going? What is she going to do? The Captain walks about her in mufti among the crowd of people, ignoring them, ignored by them. He comes, it is said, from the Orkneys and people from those islands are born with "Queer feilow," the Yard sealed lips. manager says. He seems not merely queer but momentous, his overcoat heavy with the mystery of the secret voyage. An officer's wife comes into a cabin and exclaims with delight. Girls being photographed on a plank on the ship's side giggle. And then a foreman is cursing a boy for wheeling a steel wheelbarrow over the pneumatic tubing. There is a notice chalked up:

"Watch your head, Ned. Yes, rather, Arthur."

The manager calls out: "You're working on her to-night."

" Yes."

"Have you arranged about the wind?"

Not the wind blowing cold through the sunlight on the river and brisking this scene, but the compressed air in the pneumatic tubes. Well, there she is: in two days she will be gone. They built her.

Will they forget? Is she just a job? "Yes," says the plumber, "just a job." "No," says the plater. "I sprained my ankle on her. I won't forget her." "Yes," says the welder. "I might just as well have built an hotel or a block of offices." And an

elderly man, known as Brother Gallagher, a wry-faced man, puts his hand in his pocket and taps a piece of paper. "I've got the number of every ship I ever worked on for forty years in here. Every one. I don't know whether I speak for everyone else, but I think I do. . . ".

"If you're wrong, brother, we'll tell you. . . . "

"Well, to us who work in the shipyards," Brother Gallagher says, "a ship is like a beautiful woman. That is how we think of her, maybe a young girl, skipping along, or a mother, or some heavy old woman—but beautiful."

Dead silence. Brother Gallagher is perhaps just a little well known for this speech. But the deaf caulker, pasty-faced, huge-handed, looks round, the others nod, and he says:

"What Brother Gallagher there has just said is correct."

"TO US WHO WORK in the shipyards, a ship is like a beautiful woman."



#### Escort carrier number one

In the last war the submarine made the running in naval warfare. It became a dominant weapon of the war, and although the British Navy defeated the U-boat, the performance of these underwater craft became one of the permanent problems of naval What has been the characteristic strategy. new naval weapon of the present war? Without question, the aircraft carrier. The aircraft carrier existed, of course, in the last war; but in this war scores of aircraftcarrying ships were launched from the shipyards of the United Nations. demand was for more and more of them.

It would not be true to say that the aircraft carrier was born as an answer to the submarine, but the submarine has had a considerable influence on the production of carriers. In this war, the submarine turned to hunting in packs; its ears have been sharpened by a great advance in wireless and hydrophone equipment, and now it has been given eyes as well as ears. The eyes of the submarine are aircraft. The aircraft of the Fleet carriers are the eyes of the Fleet, the convoys, and their escorts.

At the beginning of the war, Britain had nothing like enough of these great Fleet carriers to watch all her trade routes, and the Fleet carriers take as long as a battleship to build. What was needed was more and more eyes to spot the U-boats, to report back to the convoys and escorts. Britain had not got them. She was also short of escorts. The umbrella of Coastal Command with its shore-based aircraft could give a limited protection around the coasts, and the merchant seamen

were very relieved when their convoy got under that umbrella. But convoys still had to make long circuitous journeys to avoid the hunting grounds of the U-boat. Trips that had taken a matter of days now took several weeks; and the course of the Gibraltar convoy, for example, would strike a wide arc far out into the Atlantic before the ships came within sight of the African coast: for the Germans could base their aircraft on the coast of France-bases more advanced than the British. They could take their toll, and the British gradually learned that the crux of the Battle of the Atlantic, with its mounting losses, was the Atlantic Gap. How could it be provided with air cover? There were not enough Fleet carriers. Put aircraft on merchant vessels? They had no flight-decks. The best that could be done was to carry a single aircraft on the open deck and catapult it into the air when the U-boats or hostile aircraft were sighted. You lost your aircraft because the pilot could not land on again; you picked up your unfortunate pilot from the sea perhaps an hour or two after he had baled out. The catapulted pilots of the Fleet Air Arm were among the bravest men of this war.

The solution of the problem was logical and revolutionary. There was a school of thought at the Admiralty which went all out for making small aircraft carriers. Merchant ships had no flight-decks: the answer was to take some of these ships and put flight-decks on them. That meant a wholesale conversion of the ship; it also meant training the Naval Pilots to land on a deck several hundred

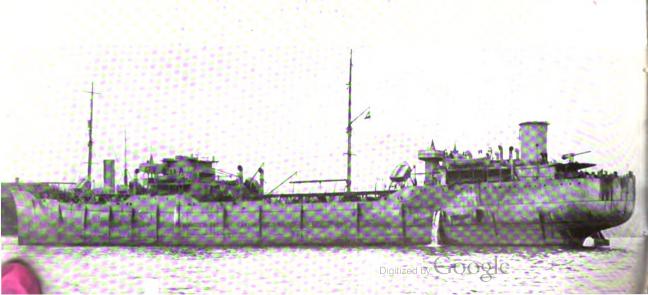
feet shorter and many feet narrower than the deck of a Fleet carrier. It meant training them to land on a deck that would rise and fall the height of a house in a rough sea, and they would have to use fast aircraft to do it. For their job was to put out the eyes of the submarine, to shoot down the fast Focke-Wulfs that did the spotting.

It is a comment on the mounting losses in the Atlantic in those early days that, when the Admiralty came to choose a ship for the experiment, the best thing they could find was a German ship. Set a thief to catch a thief: the first British escort carrier, whose short but terrific career showed us how to cope with the Atlantic Gap, was a prize picked up by a cruiser six or seven months before in the Florida Strait. She was called the Hannover and was carrying bananas on the Mexican run. Those bananas never reached Germany. Instead she was brought to England by Royal Mail engineers in June 1940, and after some repair yard had dealt with the damage the Germans had done when they tried to set fire to her, she was going to be armed and used as a trader interceptor for ocean boarding. She was going to be sent

after her old friends. She was a good, well-found vessel, built in 1939 by Brenner Vulkan, at Vegesack.

But in January 1941 her history and her shape were changed. At a little town on the north-east coast there is a small shipyard, one of those yards which turn out small steamers, sloops and corvettes, nothing much larger than 300 feet. The big shipyards were packed with work; so here the Hannover was brought. And the people in the town used to look with astonishment and misgivingfor they feared visits from the German bombers—at the hull of a five or six thousand ton merchant ship rising like a huge wall over the roofs of the houses. In the yard itself, where the workers knew they were working on an important official secret, there was a natural sensitiveness when people suggested that the job was too large for the yard. And there were some, too, who wondered, since Britain was so short of ships, why the workers began stripping off the bridge and superstructure of a perfectly usable, up-to-date vessel. But they turned to. An enthusiasm for the job took hold of them and they drove 120,000 rivets a week. Their

THE HANNOVER LED THE WAY, this 12,000-ton tanker followed. She is entering dry dock.



previous best had been 80,000.

But that is what happened. Down came the bridge, the funnel; and when she was flat they put a flight-deck on her, a mainly riveted deck. There was no island. She was as flat as a billiard table. She had no hangar under the deck and no lift for bringing up the aircraft, such as her successors had. There was no time for those refinements. When she went on her trials she was 453 feet by 60 feet, about half the length of a Fleet carrier, and they were landing on Martlets at seventy miles an hour. They painted out the name Hannover and called her the Empire Audacity, but the Navy shuddered a little at the double name. It sounded like the name of a merchant ship. They got the name altered to Audacity. Her escort, when she was taken from the yard at the moment of the birth, was the Stork; and it was the Stork, by an irony of fate, which was with her and picked up some of her crew when, many months later, the infuriated Germans put an end to her adventurous career.

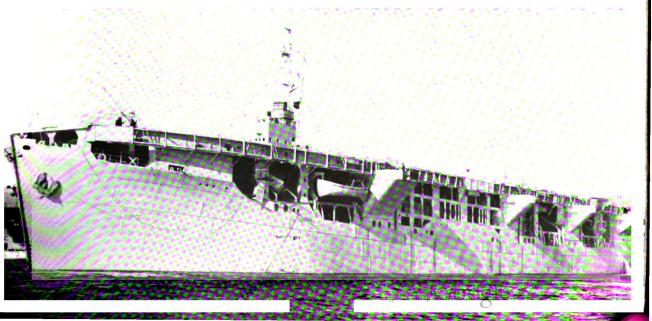
For the Audacity was a success. She proved something of vast importance. The men who put the rivets in the deck of the Audacity

played their part in an extraordinary naval adventure. She made only two voyages on the Gibraltar run—and in those days the voyage took four weeks, not the five days of the old peace time Royal Mail liners—and on those voyages her six aircraft brought down Focke-Wulfs, sank submarines and played sheep-dog to the convoy. The aircraft were on deck all the time, and whenever an aircraft was to fly off the remainder had to be perambulated out of the way on the narrow deck. It was called, with some bitterness and no restraint of epithet, "—musical chairs."

The Germans were puzzled by her and fought shy. The British were puzzled, too. Was she a merchant ship? sailors asked when she came up to the boom. And then, inside her, all the German notices had been left. She had wonderful passenger cabins. Everyone who came back alive from her two outward and two incoming voyages liked her and was delighted because she was so manageable.

The Atlantic is not a peaceful place between August and December; the aircraft had a rough time. The crews worked on machines that were caked with salt and on a pitching and rolling open deck without a sheltered

DOWN CAME THE BRIDGE, the funnel. When she was flat, they laid a flight deck on her.



corner on it. But all the memories of her—unless sailors sentimentalise—seem to be happy. "Hurry up," the Loud Hailer of the Audacity called to a small ship that had got out of station in the convoy. There was no audible reply. There appeared to be no one on deck. Presently a blackboard appeared held up by two men. On the blackboard was written in chalk, "Don't leave us behind, we've got the beer."

Then the Germans went after her. On the first outward journey and her return, they had been baffled and scared off. The Audacity's aircraft were eyes; on her last voyage, her escorts claimed to have sunk a submarine a day. But when she was on the return journey of her second voyage the Germans waited to make a dead set at her. They wanted the Audacity more than the convoy: she had caused them too much trouble. It was sometimes the custom for a carrier to leave the convoy at night, for a ship of her kind was a target among the little ships and could give away the convoy in the night hours when it was most vulnerable.

Two days before Christmas in 1941, on the

night of December 23, the Audacity left the convoy. The ring of submarines took a chance and closed in. The first torpedo was well aimed; it struck her in the engine room; she lay helpless, but she did not sink. The U-boats waited their chance for the kill. An hour or so later they put two more torpedoes into her, and that was the end. She did not catch fire: though she floated on 10,000 gallons of petrol, this had been stored in special cylindrical tanks, each one surrounded by sea water. She simply broke up and sank.

The men of the Audacity were brave men. They knew they were in one of the strangest ships in the Navy—she stood up high above the little ships of the convoy, and as everyone said, "What a target!" But they also knew they were proving something. The orders went out to the shipyards of Britain and America for more ships like the Audacity, with hangars this time and deck islands. And the men in that little shipyard of the north-east coast, who put such a spurt into their riveting, and worried about the bombers, who went home tired every night from the job, had played their part in history.

LOGICAL AND REVOLUTIONARY, the escort carrier was a success. Orders went out to the shipyards for more.



# Ships on the operating table

In war, a ship may catch a torpedo, or strike a mine, or a bomb may blow a hole in her. This does not mean that she will sink. They close the doors of the bulkheads, and if one part of the ship is flooded the air in the other compartments will keep her afloat. A tanker is very hard to sink. She is a collection of self-contained boxes, a sort of floating chest of drawers. Of course if she is hit in the engine room or the boilers she is a very doubtful case. And if she is hit in the magazine there is no doubt at all. There is a destroyer still afloat which had a bomb in her magazine, but it did not explode. could be seen in dry dock. The wireless was playing up in the bows and it seemed unearthly music.

Ships will survive appalling damage. The ship repairers have seen remarkable sights. A destroyer with the bows and stern gone. She came in looking like a cabin trunk. She was hit by two torpedoes; if she had been hit by one only, she would probably have gone to the bottom. The second torpedo gave her an even keel. Ships with broken backs. A ship with a hole in her side through which you could drive a London bus. Another with all her bridge and half her superstructure gone. She had been flattened by bombs. Her deck looked like a blitzed street. A ship that docked in two pieces. A boat they poured water into, to keep her affoat! brought in by a man and a boy. Yet another, a tanker, with most of her bottom gone, which was floated in on a mattress of compressed air.

To save a ship in wartime is everything. The repairing of ships became one of the most urgent jobs in the industry. It calls for the highest engineering ingenuity and for a capacity not to be defeated. A ship repairer is a surgeon or a doctor, who has to be ready to do anything to save a life. When you go to a ship-repairing yard, you perhaps expect to meet something like an old car dump. The truth is that at a repairer's dock you get a sense of the unity of building and the sea. People will never forget the San Demetrio coming up the Clyde.

Here is a huge 10,000-tonner on a floating pontoon. How does she stand upright out of the water? She is leaning, imperceptibly, on the dock wall. Not only do the repairers deal here with the major surgical operations on a ship, like amputating her stern or sawing her in half, but they deal with her nervous diseases. In this dock a ship has been boiled. Quite literally, they heated the water in the dry dock until the oil which had gone solid in her tanks—the tanks that lie along the keel was melted. Another has had its polarity disorganised—by an electric storm, it is supposed—so that her compass movements were meaningless. The first thing the ship repairer wanted to know was, in which direction she was lying when she was built. (They like to have this information when they are fitting the degaussing apparatus.) This particular ship, it was found, was built on a north-to-south berth, so they got her back to that position and then chipped every bit of metal on her inside and out. They hammered a new polarity into her.

Since the war, we grew used to hearing fabulous stories about the navigating of



EDGED WITH CONTORTED METAL, this cavern is where a torpedo struck the Atheltemplar. Her crew got her home, the ship repairers healed her wound and made her seaworthy again. To save a ship in war time is everything.



damaged ships and of surgical operations performed on them; but the sawing-thelady - in - half act is irresistible. The ship repairers will burn down half a ship and fit a new half to her. They will join up the remaining ends of ships that have been truncated. It is, as they say, "not difficult." It is a mathematical operation and had been done often before the war. The history of the tanker, Imperial Transport, will illustrate the process. She was out in the Atlantic when she was torpedoed 300 miles from land. There were nine oil tanks in her, numbered one to nine from the stern; five of the tanks were empty when she was struck and four were in ballast. The torpedo caught her amidships, striking her a glancing blow along the bottom and exploding in the way of No. 6 tank on the port side. It was a bad wound, the ship was sinking by her bows and the crew took to their boats; but as they watched her sink, they saw an extraordinary thing happen. The ship stopped sinking. She broke into two pieces and both portions were floating. The watertight bulkheads at the end of the tanks had saved the hull, and the Captain told the crew he was going back to her—or rather to the stern half, because, of course, the steering and engine are there. He had decided to get her back to England.

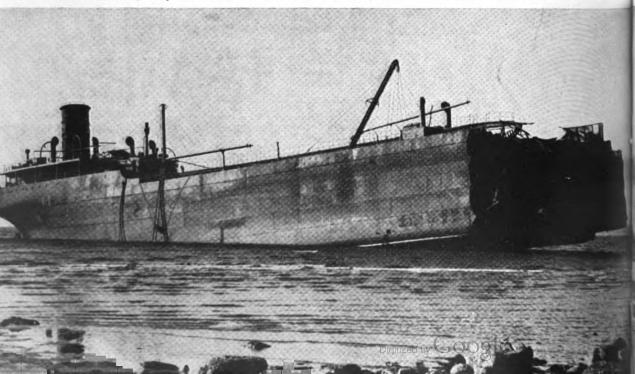
He succeeded, though she did not travel under her own steam all the way, for she was towed and beached. With her blown-off end tipped in the air like the bows of one of those flat boats they used to send down the waterchute at the Crystal Palace, she reminded one of a chest of drawers with a funnel on top mysteriously bumping across the seas. They got her in. They docked her on centre and bilge blocks: that is to say, on a wooden track like the three lines of an electric railway. The men with their burning lamps came along and cut away the wreckage. Then, at the other end of the dock, they built a kind of cradle, to receive the new forward portion that was going to be joined to her. What are called "standing ways" were built. On these, sliding or launching ways over sixty yards long were laid, but they were laid level and not at a slope which is the usual method when a new ship is being launched. Men pasted a quarter of an inch of grease and soft soap on both these ways. Then, at dead slow water one day (because they did not want the old end of the hull to start floating), they shunted in the new fore-end.

They had to preserve the correct sheer and camber of the ship, they had to be sure she could not start a slewing movement when she was launching. They had to see, when the two parts were joined, that the keels were in line and that if there was a sag it was righted, for a ship may, as they say, "sag" or "hog." Actually the shunting of the new fore-end was really a process of drawing her in along the greasy ways by purchase wires run off a capstan. She moved nine feet towards the junction in three hours and that was considered top speed; after that they slowed her down to get the alignment and overlaps dead right. She dovetailed in at last like a joint of

wood and, counting from the beginning of the launching operation, it took seven working hours to finish the job. A new ship was ready to sail.

The ship repairers who worked on jobs like this are men of great experience and knowledge; but they also have a zest for difficulty and a flair which, in other professions, would be called inspiration. A similar gusto seems to be in the workmen of the repair yards. They are lucky. Every job is different. The Teakwood, for example, was another tanker which had to have a major surgical operation. She was one of the first vessels to be torpedoed in the war, as early as September 1939. She was caught at the entrance to the Bay of Biscay, and after she was hit she broke her back. Nevertheless, she got into Falmouth without help. peace time they would have scrapped her, but in war she was valuable. They docked her with difficulty, gave her some temporary repairs and then let her out again to go under her own steam to the North of England,

HALF CAME HOME. When the Imperial Transport was cut in two by a torpedo in mid-Atlantic, they sailed the stern half to Scotland, beached and later docked it.



where they proposed to make a new ship of her.

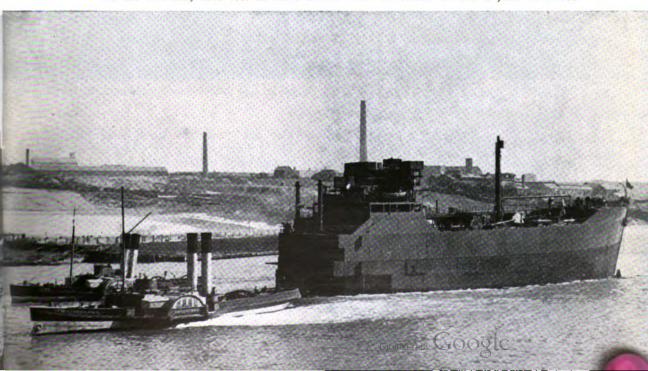
She was a problem. Her fore-end, that is to say the bows, had dropped just over five feet, so that she looked like a broken stick—the wreckage was at the point of the break-and she was also twisted from stem to stern. They got her into the dock and raised the keel blocks beneath her to let her settle. They cut fifty feet out at the break and were left with two unjoined hunks of ship. When the forepart had settled they took sights and found that the after-part was 111 inches out of the true on the starboard side, so they ballasted this section and floated it out of the dock to the quay. The problem was how to float it in again so that her keel this time should be in strict alignment and also level.

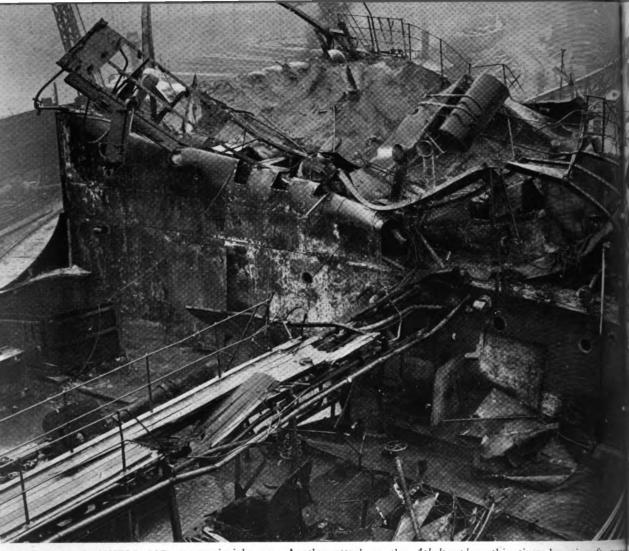
In these shipbuilding towns one strikes the occasional artist whose brain is alight, who feels the job and is rightly exuberant about his inspirations. The men responsible for repairing the *Teakwood* were artists. The ship repairer did not know how he was going to get

the ship into line. "They told me it couldn't be done," he said immodestly. "So then I knew we had to do it. I invented my patent." He bolted two cruciform supports with brackets in them to the bottom of the dock. and put two vertical stops or lugs on the keel. When the after-part came into the dock, she had to fit square to the brackets. They sent a diver down to have a look; a small group on the dockside were wondering if they had fixed her-she was an 8,000-ton ship-or whether the patent had failed. The diver down below went to the brackets. When he came out on to the dockside and got his head out of his helmet he said, "I canna get the blade of my knife between them. I tried." One imagines him trying.

Ships came in, patched up by the crews, with screens of logs hanging over the hole to break the seas. Under the logs one could see the steel plates torn like soft corrugated cardboard, crumpled up in folds like carpets or jammed together in the bows, concertina fashion. The essence of the problem for the

NEW BOWS WERE BUILT, towed down the Clyde. At dead slow water they shunted on the fore-end, nine feet in three hours. She dovetailed in like a joint of wood.





A SIMPLE JOB, as repair jobs go. Another attack on the Atheltemplar, this time by aircraft, turns

Captain was to keep the ship upright and preserve her stability. There was an 8,000-ton cruiser which got a torpedo in the forward end of the forward boiler room. "First she floods, then she lists." The first thing they had to do was to keep the aft engine room free of water. "Once that was done, the difficulty was to keep her upright and stable with so much free surface," a naval architect explains. By "free surface," he meant that loose mass of water in a ship which rolls about like a shifting cargo. Letting more water into another part of the ship will often, therefore,

keep her steady and preserve her balance. This cruiser came up the Clyde one evening at six o'clock, with six dead men in the boiler room, which had not been opened; but she was safe and upright.

These temporary repairs at sea reached heights of ingenuity. There was a ship crossing the Atlantic with a refrigerator cargo, in the winter of 1942, when she was struck. The blow came in the stern, but so robustly had the ship been built by a British shipyard that the propeller shafting stood up to the blow and was undamaged. She was



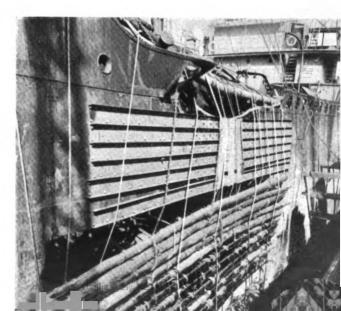
her bridge into scrap.

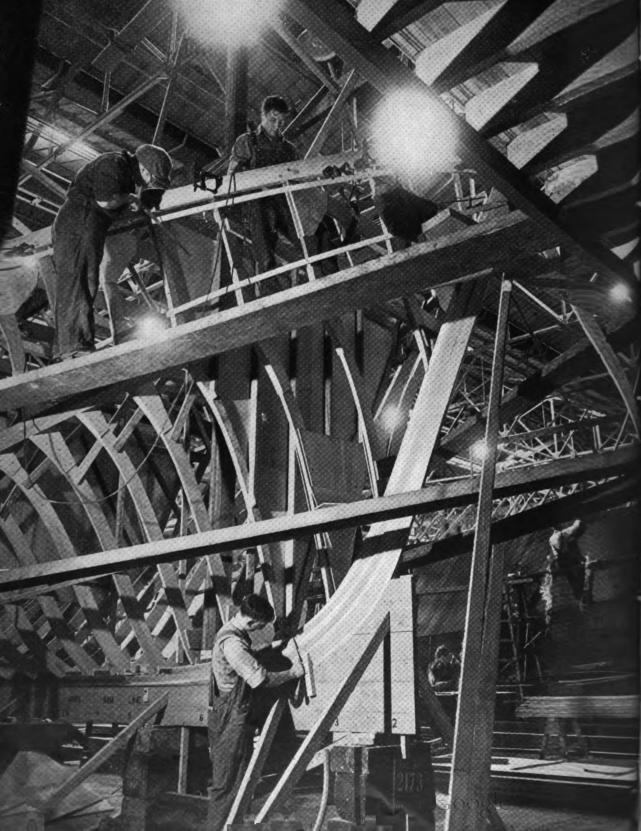
able to limp to a small island harbour, and there, with what materials he could scrape together in the place and what labour he could train, the Captain decided he would patch her up and get home. By the time she got to the harbour she stank. Many insulated hatches were broken and there were hundreds of tons of butter and mutton which immediately began to rot. Before starting the repair work, the crew had to clear out the cause of the awful stench.

The area of damage was 45 feet by 32 feet; part of this huge hole—the size of a small

house-was under water, and there was no dry dock to put the ship into. The first difficulty was to get people to work on a ship who had never done such work before. And then, once they had started, the gas for cutting and welding failed. The "Z" and "T" bars of the ship had to be hand made. It was the same with the rivets and bolts. ship's plates had to be cut cold with a chiping tool. Still, they pumped her dry and hit on the plan of sending men inland to cut down pine trees on the island, sawed them into planks, bolted these box-fashion over the hole and filled the box with concrete. There was no proper steel for holding the boxes, so they shored them up with lengths of railway line. In a month this unhealthy and miserable wreck, with its suppurating wound, was ready for sea again. You can read the Captain's letter. It is a model of official understatement. One sentence stands out: "Many of our plans had to be scrapped or modified from time to time." It is the only personal comment he permits himself.

A SHIP CAME IN, patched up by her crew with a screen of pine logs and lengths of railway line, lashed together with steel wires carried under the hull. It looked like a huge Venetian blind.





# Building the little ships

On the morning of August 19, 1942, a fleet of boats moved through the fog to the coast of France. It was an invasion fleet, and from the air the host of boats must have looked like hundreds of war canoes of the South Sea Islands. There were destroyers, motor gunboats and torpedo boats, escorts of all kinds, and those landing barges which look flat and black like water beetles creeping across the sea. It was the day of the Dieppe raid, a day of the little ships. Eighteen months later they were out again, crawling to the coast of Sicily, and even more peculiar craft were seen. The news cameras caught them, barge-like craft with what looked like battlements or painted forts. They were a group of American troop carriers which had been brought across the Atlantic; but, with this chief exception, all the craft which landed troops, guns and stores, the paraphernalia of a whole army, on to the shores of Sicily, had been built in the British Of the 2,400-odd landing ships and landing craft which, two years later, took the British invasion forces to Normandy, nearly 2.000 were British-built.

These smaller craft had for the most part been made by the constructional steel firms all over the country and often far inland, by firms which, before the war, were making locomotives and railway rolling stock, steam rollers, bridges and the steel skeletons of office buildings and blocks of flats, firms which had fitted out the big department stores in peace time. Once they had been fitting staircases, counters, wardrobes and shop windows. Now they might be building a whole ship inland, which had to be trans-

ported by heavy lorry to the launch; or simply turning out sections like sectional huts to be assembled at the waterside. And then there were the small boatbuilders, experienced in this trade, dotted round our coasts and up the rivers, too. There are names famous to those who, in peace time, were devotees of pleasure cruising and speeding on the sea. The old-timers in boatbuilding and the firms who went over to this work had a huge variety of craft to build. It was not simply a question of landing craft and torpedo boats and gunboats. There were the minesweepers. the harbour-defence vessels, the rescue tugs, the corvettes, the old wooden drifters, built up on the Aberdeen coast by the people who had made the fishing boats and now built wooden ships to deal with the magnetic mines. There were all the small boats that wait on and provision the big ships. There was even the kind of boat which goes out to collect the dummy torpedoes after the aircraft carriers and the submarines have been practising.

Let us start with the landing craft. The Admiralty divides them into two classes—the major and minor; and the rough difference between them is that the minors can be carried by a ship to the scene of action, while the large ones, carrying the tanks, the troops and the guns, and dating from the old cross-Channel horse carriers of the last war, make the whole journey on their own engines. We paid more attention to the smaller craft before the war, and we had built a few before Dunkirk. Then in 1941, the big demand for these assault boats started. First of all, the old-time boatbuilders made them; but it was



SIXTY MILES FROM THE NEAREST SEAPORT, women workers in a West Riding shipyard are building landing assault craft. The frame begins to take shape in the assembly shop.

Digitized by Google



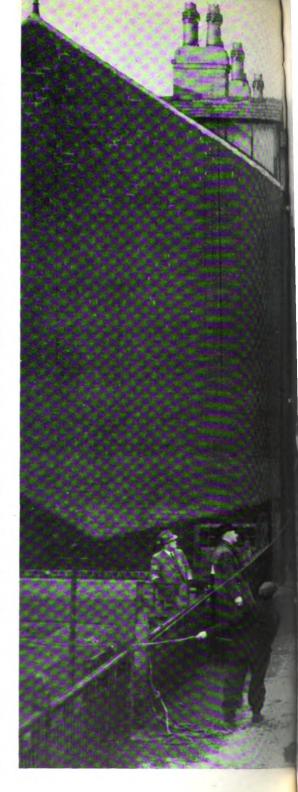
not a job for the experienced craftsman. They were simple, flat-bottomed vessels with armour in them, forty feet long and with a ten-foot beam, and they were a job the joinery and building firms could easily do. That is one of the reasons why we had to do without new houses and fittings. The engines that moved them were conversions of motorcar engines, something like the Ford V-8. On the Dieppe raid we used old liners and cross-Channel ships to carry the troops and their assault craft, and to drop them on the fierce last lap of the journey.

The major landing craft—what we call the tank barges—are a different proposition. They are built of steel and not of timber. You saw them lying like huge rusty removal vans, near the river's edge, with the welder's torch fizzing and twitching round them; they are just about the plainest thing that ever went to sea. It would be easier, one imagines, to feel affectionate about a dredger. The big shipvards started building them in 1940; but this system held up the building of the big ships, so the task of providing an invasion fleet was given, as we have seen, to the constructional engineers, first of all in the Clyde and the Tees, and then all Britain and Northern Ireland. This sounds like a simple matter of transfer, but in fact it was like starting a new industry. A little improvisation was possible. Some of the old Thames barges were converted to carry vehicles; the Thames barge builders took lighters and what are very expressively called "dumb barges," cut a ramp in the stern, and fitted them with a couple of Chrysler engines. But elsewhere shipyards had to launch the craft.

The tank landing craft is said to have been the beginning of prefabrication in England. There are always many schools of thought about the start of prefabrication; certainly the sections came riveted from the engineers. When the sections were assembled, you had a boat 200 feet long, with a forty-foot beam, which would carry 300 tons of tanks.

But let us look again at the wooden ships. Once more the wooden walls of England were holding the Channel. For it was over and over again the motor gunboat and the motor torpedo boat that we sent out against the E-boats in these narrow seas. On the estuaries and inland rivers, close to those places where yachtsmen gathered before the war, you could see the building of these boats. They lay beside the towpaths and in their dazzle pain. they look unreal, like stage boats from a musical comedy, painted to the colours of Edinburgh rock. And, indeed, the building of these small boats, deadly and immensely speedy as they are (they have converted aero engines inside them), is a softer, quieter, cleaner job than the steel work of the north. You step out of the boat shed into smokeless air, with the smell of cut wood and sweet varnish in your nose; and in the main building, where the hulls are lying, there is hardly a sound louder than the rat-a-tat of the girls' hammers on copper rivets. Yet some of these boatyards have grown and swamped the life of small southern villages, as though a film company had suddenly invaded them.

The builder of M.G.B.s and M.T.B.s has a handier job than the big-ship builders. He can use unconventional methods. Here is a yard, for example, where they are building hulls upside down. The pieces come in in section. They will start with the bulkheads, which is rather like beginning to build a house with the inside walls. Then the frames and stringers come in from the shops and are put in place, and the keel or chine goes on last. Here it is that the girls, in their gay overalls, are tapping screws, and the sound of the pneumatic driver has not the machine-gun uproar of the shipyards. Youths and girls are everywhere. They stand up above on the keel. They look, with their lamps, out of the hull. They are not only planking the hulls; they are making the ship's furniture, the oil and water coolers, the tanks that look like enormous mattresses in their self-sealing covers. Girl electricians are making the instrument boards and the switch panels. They work, too, on the sheet metal, and the highly skilled ones are working

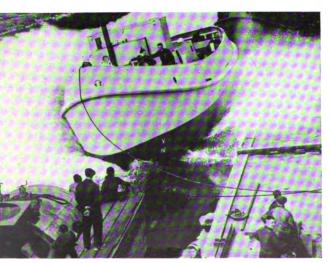




THE BACK-STREET BOYS. LCA 1144, one of many assault landing craft built in the same West Riding factory, is hoisted on to a trailer for her first trip.







WATCHED ONLY BY A FEW of the workers who built them, LCA 1144, a tank-landing craft, and a prefabricated tug take the water.

on the adaptation of aero engines to marine use. From fifteen to thirty are the ages preferred. One notices the numbers of educated women; but skill, the blunt and experienced foreman will tell you, has nothing to do with education. He tells you Miss So-and-so is "a good soldering women," and that is that.

There are so many kinds and degrees of prefabrication that it would be tedious to go into it all. But the small-boat industry has made one revolutionary step in its production which must be mentioned. Beside the worldfamous boatbuilding yards, there is a large number of small yards scattered round the coasts of Great Britain. They were craftsman yards. Time and output had no special object But when the war came the Admiralty saw that these firms, too, could play a part in the kind of production the war demanded, provided they could be given standard designs and could be moved as one unit. An ingenious scheme was put forward. Roughly speaking, it was this: a central brain was established to supply all these yards and to set the pace, a brain which would order so many boats, and supply everything for them from a keel to a screw and deliver it to them, like a conveyor belt, by road or rail, at the precise moment each yard needed it. Central stores were set up, and daily the lorries or the railways collected the next portions of the boat required by the builders -screws for Cornwall, planks for Glasgow, engines for the East Coast, wheels for the south, and so on. The builder did not have to build from scratch: he assembled; and he could always rely upon next week's work arriving ready cooked, as it were, like the next This distribution from central warehouses to all points of the compass added greatly to the British small-boat fleet.

You go to a large shed off a London by-pass, and inside you will find all the metal that will make scores of boats. Here are dozens of compasses, wheels, bells, engines. Here stand a score of brass rudders. Here are bins of pipes. Five tons of screws,



nuts and bolts go into every boat: here they are. There are 1,500 different sizes of fastenings, from the long copper nails to the smallest screws. There are thirty-five different types of nails. You see the day's delivery to the boatyards being made up.

Near this store you will see a motor-coach builder's shed. Here they are making the wooden bulkheads. These large areas of timber lie on benches in the room; they look like pieces of a giant's jigsaw puzzles, big blobs of pink mahogany already cut to shape. Some of them stand against the wall. They are twice as high as a man, and you will see a girl in dungarees put a ladder against them and go tapping the thousands of rivets into them. Behind the bulkhead is another girl holding the rivet. How does she know which rivet is going to be hit next? These pairs of girls, patiently knocking in rivets for the whole of a working day and doing nothing else, work by ear. That tap of the hammer on the wood, like the sound of the caulker's mallet on the wooden decks before the war, is the natural, hypnotising music of the industry.

At the timber stores the scene is not so passive. Timber from Africa comes up the river and lies in the water looking dirty, swollen, gnarled and twisted, like huge old bones. When it comes out of the water, the saws run through it, cutting it into long sandwiches. The man with the adze gashes into it. Gradually that surly tree trunk is leaved and cut into the hundreds of predesigned shaped that the boatbuilders require. Each foot of timber on a ship has been numbered. A dozen 153s are wanted? Here they are. This place, like the metal stores, is the mother of innumerable ships, each one alike. You can go in here and order every inch of wood for a ship, to the right size and shape. You can have a ship delivered to your door in its component parts, complete. Order is the god of modern life. They could build you a million houses, a thousand cathedrals, railway engines, anything you like.

From these intensively organised stores, where every piece was numbered as the hairs

of one's head are said to be, where checking and re-checking was the hourly business of the day, where people were dealing all the time not with boats, but with units and numbers-the material went out to the boatbuilders of England, Scotland and Northern Ireland, the small, old-fashioned yards of the sea ports, and to those longestablished little businesses where the pride of craftsmanship is great, but which during the war might have died. It was a strange partnership of the very latest methods with the least modern yards—least modern in the sense of speed of production. Boats from these small yards, boats from the famous vards, and boats from the furniture shops, the building contractors, the motor works, went to fight in every sea and send up their tempest of spray as they almost flew out of the water into action.

"PATIENTLY knocking in rivets for the whole of a working day." She builds the wooden ships.



#### **Epilogue**

What did the British shipyards achieve? Let us look at the figures of production. Mr. Alexander, speaking in the House of Commons, during the debate on "Shipping and Shipbuilding," on November 1, 1944, said:

"I want to give some details which have not been given before, which will give the House some idea of the immensity of the naval shipbuilding accomplished by the United Kingdom in this war. I am giving the figures from September 1939 up to the end of 1943, Of major war vessels we completed 634, with a total standard tonnage displace-Of mosquito craft, ment of 1,183,501. including motor gun-boats and torpedo boats, various types of motor launches and motor minesweepers, we produced 1,260 of a tonnage of 120,358. Of other naval vessels, including landing craft of all descriptions, armed trawlers and miscellaneous types, we produced 2,729 of a tonnage of 334,919. These figures compare very favourably with the output of the last war.

"Some indication of the magnitude of the effort put into merchant shipbuilding of all types in this war is given by the figures and tonnage of the ships constructed. In the four months from September to December 1939, we completed 56 vessels of a gross tonnage of only 243,000. In 1940, the number of ships completed was 182 of a total tonnage of 810,000. The number in 1941 was 236, of a tonnage of 1,158,000. In 1942, the number was 259 of a tonnage of 1,302,000. In 1943, when we were beginning to get back to some other work, the number was 237 of a tonnage

of 1,204,000. The tonnage of merchant vessels launched in the four war years 1915-18 was a good deal less than the tonnage we launched in the four years 1940-43, in spite of the fact that we had fewer yards and ships, and less labour available than in 1918; and in spite of the black-out, and air-raid damage to the workers' homes."

The work put in by the ship repairers had an enormous importance. It is a surprising fact that nearly half the shipbuilding labour in Britain was devoted to repairs, and the increase of this kind of work was due not only to the larger superficial and underwater damage caused by air attacks, but to the great amount of time our ships spent at sea.

The dockyards put back over a hundred and forty million gross tons of merchant shipping into service in the first three years of the war. In the spring of 1941, the peak period, over two and a half million tons of merchant shipping were under repair. (The corresponding figure for 1914-18 is one and a half millions.) And so in 1943, when the worst phase of the U-boat war was over, the shipyards of Britain, Canada, and the United States could pay one another compliments. Mr. Winston Churchill said:

"The output of new building from the United States has fulfilled all that was ever hoped from it and more. We build our regular quota in this island, and the Canadian output, an entirely new development for Canada, is also remarkable. The credit balance of new building over losses of all kinds, including marine risks since the beginning of the year, the net gain that is to

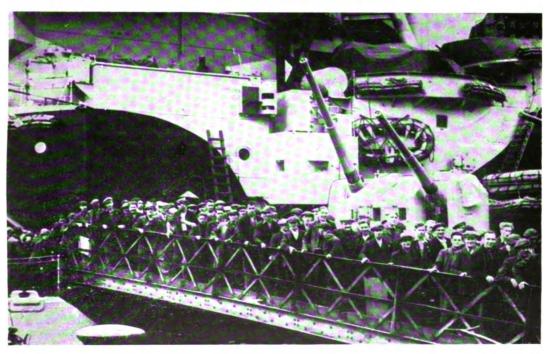
say, exceeds six million tons, and should the present favourable conditions hold we shall soon have replaced all losses suffered by the United Nations since the beginning of the war."

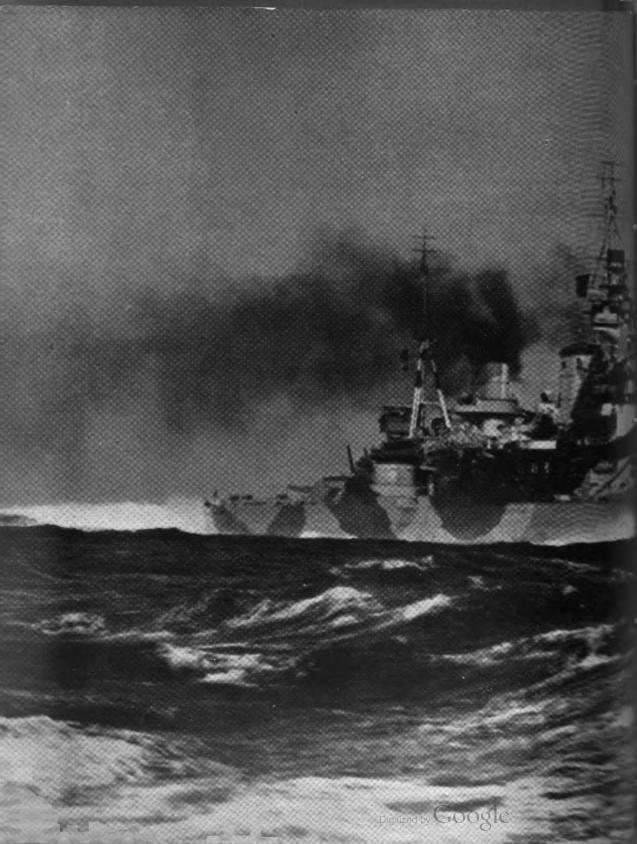
By November 1943 Colonel Knox, the United States Naval Secretary, could announce that achievement: "We had by Thanksgiving Day built more tonnage than has been sunk in the entire war. It is the most amazing achievement in the history of the war. Much credit is due to our friends, the British and the Canadians."

This great shipbuilding and ship-repairing achievement was made possible by the technical recovery of the shipyards of Britain and Northern Ireland, and by the inherited skill, the experience and the versatility of their craftsmen. Versatility, perhaps, above all: for the whole story of shipbuilding in Great Britain during the war is summed up

in the word adaptation. On Clyde and Tyne, at Belfast, in all the real shipyards and the temporary ones, men and women, craftsmen and labourers, worked long hours a day, putting in their night shifts when the black-out let them. They worked when the menace of the U-boat was black, when every rivet they drove was a fight for Britain's next meal, her drop of oil, her next tank or plane; and they worked on the offensive, too, when the menace retired and there was the first sight of victory. No one who has heard the fusillade of the riveters under the dull northern sky, day after day, week after week, or who has heard the endless hammer-taps of the boatyards, will fail to grasp the meaning of that harsh grey monotone which went on for six years of war. Hearing those sounds, you heard the collective anger, the collective will of the British shipmakers who have known throughout their history that the ship is pre-eminently our weapon and our need.

"WELL, THERE SHE IS: in two days she will be gone. They built her."

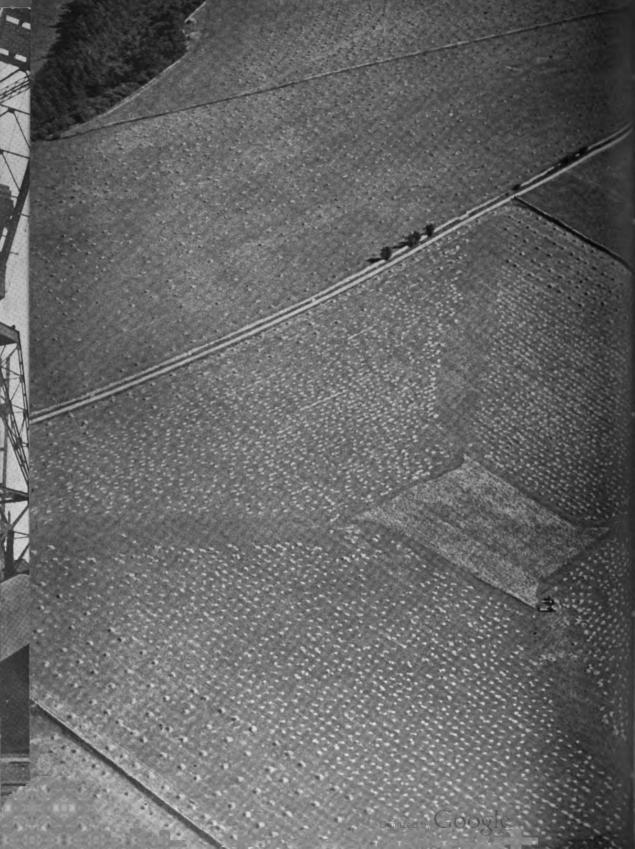








cqti But. ministry information = SPECIMEN OF BRITISH WAR. LITERATURE SUPPLIED FOR THE FARMS FIGHT TOO ...







England is traditionally a food-importing country. After the Napoleonic wars, England's dependence on foreign corn in particular grew rapidly. The reproduction shows merchantmen in West India Docks, Port of London, about 1830.

### PROLOGUE

BRITAIN is a maritime nation. For years her shipping has sailed the seven seas, bringing many things from the four corners of the earth. One of her largest imports was food—meat from the Empire and Argentina, wheat from Canada and America, dairy produce, fresh vegetables, bacon and eggs from the Continent of Europe, and a thousand things besides.

Britain, with her dense population and her

highly industrial character, had come more and more to depend upon imports to feed her people.

When in 1939 Britain was once more faced with war, the farmers were called upon for a supreme effort. Their job was as important as any other, more important than most. The Royal Air Force could win brilliantly the Battle of Britain, the Royal Navy could sweep the seas

Digitized by Google

and bring the convoys safely home, the British Army could drive Rommel out of Africa, but all this would be without avail if the farmers of Britain could not produce enough food to cut our imports to a fraction of the pre-war figure. Could the farmers and the farm workers achieve the almost impossible? Here is the story of how these men and women of "decadent" Britain, in three and a half years of war, working all the hours of daylight and often into the night, made Britain's production of food nearly three-quarters as much again as it was before the war.

The world has heard with admiration of Great Britain's wonderful achievements in the sphere of armaments production; of the huge army and air force which she has built up during the war; of the great additions she has made to her navy. But—as you who read the following pages will realise—an effort equally admirable and successful has been made on the land. When the history of the war comes to be written, the achievements of British farmers and farm workers, of all concerned with the land and its produce, will be seen to have played a cardinal part in the achievement of Victory.

A farmer examines a sample from his rick.





Stooked corn waiting to be carried.

#### THE PRODUCTION OF FOOD

AGRICULTURE is Britain's greatest industry. Before the war it employed about one million people, 2 per cent. of the population, but even so the United Kingdom imported more than 60 per cent. of the food that it consumed.

When the war started in 1939 the cultivated area of the United Kingdom was nearly  $31\frac{3}{4}$  million acres but this was between  $2\frac{1}{2}$  and 3 million acres less than during the war of 1914-18.

Of this area nearly 13 million acres were arable land—several millions less than in 1918. Immediate steps were taken to increase the arable acreage.

Since May 1939 a bonus of £2 an acre has been paid to farmers for all land ploughed up that

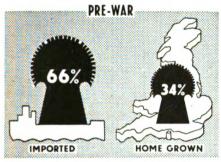
had been down to grass for seven years or more. By 1941 this area had been increased by about 30 per cent., and 1942 saw a total of nearly 18 million acres of arable land. But even this was not enough, and early in 1943 the Minister of Agriculture asked the farmers for another million acres—and the farmers went to it with a will, for no section of the community has worked harder for the war effort than the farmers and agricultural workers.

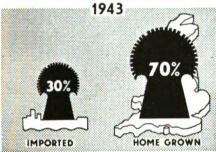
As is explained later, the first place in the war-time plan for agriculture is given to milk, and this is followed by wheat, oats, potatoes, sugar-beet and barley. In England and Wales the acreage under wheat had increased in 1943 by over one-third in comparison with the

Digitized by Google

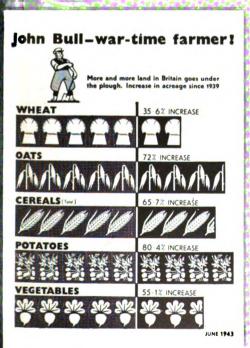
#### BRITISH FARMERS TILL WITH ALL THEIR MIGHT

Britain's great achievement in the effort to feed herself





The symbol used  $\P$  indicates all foods



pre-war acreage. The United Kingdom acreage of oats had risen by about 72 per cent.

The sugar-beet crop has been increased to the maximum that the factories in the United Kingdom can handle—the sugar produced is invaluable, but it is not considered to be sound policy to increase the number of factories in war time.

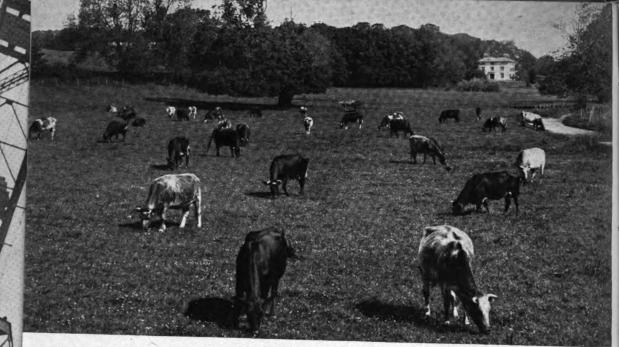
Before the war large quantities of new potatoes and tomatoes were imported from the Canaries, the Netherlands and the Channel Islands, and onions from Spain. The cut in consumption of meat has meant an increase in the consumption of vegetables, and this has been met by an increase of over 55 per cent. in their production.

It is a well-known axiom that you cannot get more out of the land than you put into it, whether this be fertilisers or labour. Great care is taken in these days of intensive production to see that the land is well cultivated and correctly fertilised. To ensure that the best use is made of the available supplies, phosphatic and potassic fertilisers are only obtainable by farmers on permits issued by the County War Agricultural Executive Committees. These permits are based on the needs of the soil and the particular crops to be grown.

Proper rotation of crops is essential in intensive cultivation and here again the War Executive Committees have a job to do to see that the land is well treated.

Potatoes have been one of the mainstays of the war-time diet and the actual acreage under potatoes has risen by over 80 per cent. So vast indeed was the crop in 1942 that great efforts had to be made to encourage people to eat potatoes, in order that there should be no wastage.

Altogether the total increase in the food production of the United Kingdom had reached the amazing figure of over 70 per cent. by 1943.



A typical English dairy-farming scene.

## FEEDING-STUFFS

IN addition to the heavy import of food for human consumption, the United Kingdom annually imported over eight million tons of feeding-stuffs, including the by-products of U.K. manufacture from imported raw materials. These imports make a heavy demand upon shipping and so, when the war started, it became necessary to cut down these imports as well as those of food.

From the very start, pride of place in agriculture was given to the production of milk, one of the most essential foods in the world. Milk in its natural form cannot be sent to Britain from the



Milking time on a modern dairy farm.

Empire and America. Dried milk and tinned milk America has sent in plenty, but liquid milk is essential for babies, young children, expectant and nursing mothers and invalids. Properly balanced rations must be provided for milk production and cows have had the first call on the reduced imports of feeding-stuffs. The production of milk is also greatly influenced by the quality of pasture available, and the special steps taken to improve pastureland are dealt with later.

Yet another consideration is the direct bearing that the number of cattle, sheep, pigs and poultry has upon the fertility of the land. Animal dung is an essential manure and there is no means of replacing it with artificial manures. If the number of cattle, sheep and pigs was allowed to dwindle too far, the fertility of the land would suffer so much that it would very soon affect the quantity and quality of the food crops.

All the same, the numbers of pigs and poultry had to be cut drastically. Cattle and sheep



Over 4,000,000 children receive milk at school every day—a great number without cost.

can be maintained on hay, grass and bulky farm crops grown in the course of the rotation. Pigs and poultry need concentrates, and compete with human beings for grain. Their rations had to be considerably reduced, and



although "swill" feeding increased, numbers fell.

So far as pigs were concerned there was a great increase in "swill" feeding. "Swill", or kitchen waste, had been used by pig-keepers near large towns for many years, but in the country was little known. In the big towns, contractors arranged for the kitchen waste from large hotels and restaurants to be collec-

ted, and in their turn passed it on to subcontractors or direct to the pig-feeders. Since the war, much greater efforts have been made to collect kitchen waste, and special bins are provided in the streets in which each housewife can put all edible waste. All the "swill" from the Armed Forces is similarly put to good use. Organised collections of military and civilian "swill" amount to some 500,000 tons a year.





Above: With a truck towed behind a car, members of the Women's Voluntary Services collect kitchen waste in an English town.

Above, right: Before it is mixed with meal the "swill" is cooked.

Right: Feeding a mixture of "swill" and meal to young porkers.





Members of a County War Agricultural Executive Committee examining samples of wheat in a field.

## THE COUNTY WAR AGRICULTURAL EXECUTIVE COMMITTEES

BEFORE the war most of the agricultural planning was done by individual farmers, but when war came it was necessary to plan agriculture on a national basis.

As we have said, the United Kingdom imported over 60 per cent. of her food. Imports on such a scale were out of the question in war time. All luxury and non-essential foods had to go and every effort had to be made to increase the

production of food. This meant that not only must all possible land be used for growing food (this will be dealt with later), but that all land must also be used to the best advantage.

For these purposes the Minister of Agriculture set up the County War Agricultural Executive Committees. These Committees, 62 in all, one for each of the Administrative Counties of England and Wales, consist of from eight to



Above: The machinery officer of a War Agricultural Committee plots his ploughs on a map.

Right: A member of a County War Agricultural Executive Committee gives instruction to farmers in the use of artificial manures.

Below: Experts examine a field to see if it is suitable for growing clover.



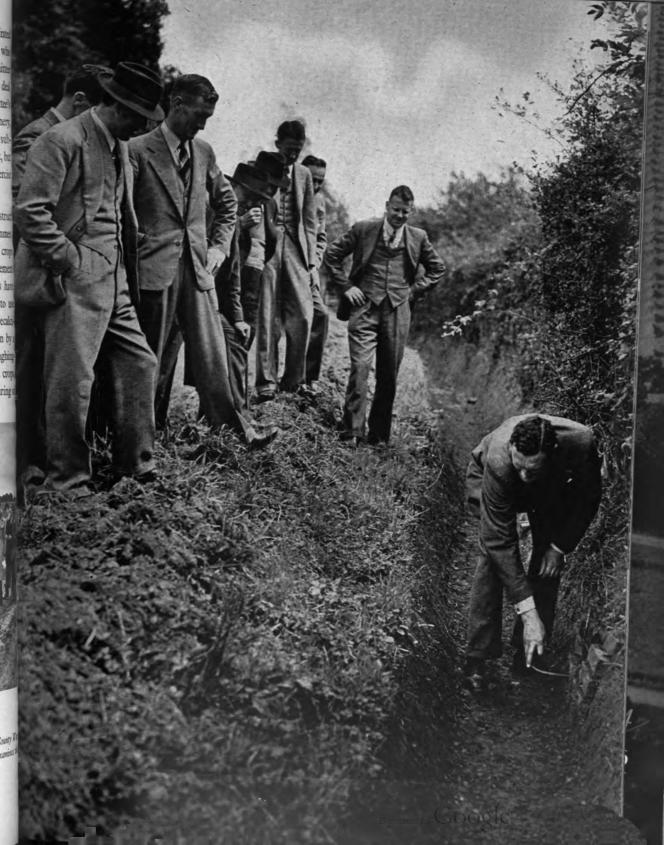
12 persons, each one of whom is appointed personally by the Minister of Agriculture, who also selects the Chairman. Each Committee has a number of sub-committees which deal with various sections of the main Committee's work, such as cultivation, labour, machinery, livestock and land drainage. These sub-committees supervise the day-to-day work, but only the Executive Committee can exercise the powers given to it by the Minister.

To this end the Committees advise and instruct farmers regarding their cropping programmes. The ploughing-up of grassland and the crops to be grown are generally settled by agreement with the occupier; but the Committees have compulsory powers in the background to use in the few cases of incompetence or recalcitrance. The most usual directions given by a Committee are concerned with the ploughing-up of grassland, the growing of specific crops, the application of fertilisers and the clearing of



The Technical Sub-Committee of a County War Agricultural Executive Committee examines the drainage system of a farm,

Digitized by Google



farm ditches. An Executive Committee also has power to give directions to farmers about the number of livestock that they may keep, although persuasion and not coercion is the means employed wherever practicable.

One of the sub-committees deals with Technical Development and is concerned with advisory and educational services to farmers. It is the duty of this sub-committee to see that all farmers in the area for which it is responsible are kept informed of the latest developments in the science of agriculture and also have the opportunity to learn new methods of cultivation, etc. It has been found that the most successful method of doing this is by means of practical demonstrations on farms. These demonstrations can be attended by all local farmers and they can see for themselves exactly how a particular job is done. The Technical Development Sub-Committee obtains notes, suggestions and any other help it may need from the Technical Development Committee of the Ministry of Agriculture.



Farmers receive advice and recommendations from a County War Agricultural Committee.

This exhibition to encourage the making and use of silage was organised by a County War Agricultural Executive Committee.





Pulling up a small tree with chain tackle and track-laying tractor.

### RECLAMATION AND RE-SEEDING

AMONG the most important items in the war-time programme of agriculture are the reclamation of land and the re-seeding of poor-quality pastures and rough grazings.

Reclamation of land not previously, or not in recent times, used for the purposes of agriculture has made great advances in the last three

A disker at work on reclaimed land.



or four years. To a great extent, it has been made possible by the use of special machinery, supplied on lease-lend by the United States, and by the use of powerful tractors.

Much of the reclaimed land is old farm-land which has been allowed to fall into disuse. Drains have become stopped, thorn, bramble, and young trees have grown, and the land has become a wilderness. Such land has been examined by the County War Agricultural Executive Committee, who have decided that it must be reclaimed for agriculture. The Committee then directs the owner to clear the land, and if he is unable to do this the Committee takes over the land with the consent of the Minister of Agriculture. This is usually

Waterlogged land like this in Devon grew nothing but reeds and coarse grass.

A special plough drawn by a track-laying tractor is used for ploughing up bracken-covered land on part of a reclamation scheme.

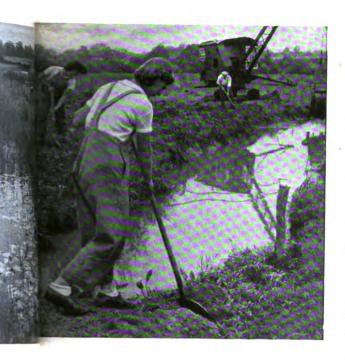




an entirely friendly arrangement. The owner has not the capital available to sink in the reclaiming of the land, but he has no objection to the Committee taking it over. He will, in fact, gain considerably in the long run, because if the land is handed back to him it will be worth a lot more than when the Committee took it over.

Owing to the necessity of producing as much food as possible there has been some reclamation done which has cost too much to be a commercial proposition in ordinary times, but on the other hand there has been a great deal done that will show a handsome profit over a number of years and has greatly increased the value of the land.

The reclamation of land covered with bracken, gorse, etc., has been done by the use of special ploughs which completely bury the bracken and small gorse bushes, only the larger bushes having to be grubbed up before ploughing starts. The ploughs are drawn by track-laying



e to sink in
e has no obic
over. He in
long run, bec
to him it in

producing as a seen some received too much in a cordinary times as been a great disome profit or greatly increase.

by the use of special bury the brackers the larger best perfore ploughtrawn by track-lar

tractors and in many cases the work has been done in an amazingly short time, due to the keenness of the tractor-drivers. These men (for this very heavy reclamation work it is essential to use men and not women) have frequently worked a fifteen-hour day, seven days a week, with only two one-hour breaks each day.

In Wales, the Dolfor Hill Reclamation Scheme tackled 750 acres of typical Welsh hill-land covered in bracken, gorse, heather and coarse grass. The land was ploughed, cultivated, harrowed, manured, and 650 acres of it sown with potatoes in only six weeks. This was a magnificent achievement and was only possible because of the enthusiastic co-operation of all who worked on the scheme.

Another type of land which has been reclaimed is fen-land in the eastern counties. Here, of course, one of the most important items has been the clearing of ditches and the laying of drains. It has also been necessary to build

concrete roads so that farm vehicles can get to the reclaimed land at any season. In the past much of this land has only been accessible in the summer months as the peat roads become impassable in winter.

One of the big obstacles in clearing fen country is the frequent presence of bog-oaks. These are great trees found lying with their top sides just under the surface and their lower sides resting in the clay soil beneath. The method of dealing with bog-oaks is to dig out the soil all around (and here the Women's Land Army has done great work) so that the oak is left lying in an open trench. Then it is cut into sections and dragged out by a track-laying tractor, although in some cases the Royal Engineers have assisted by splitting the oaks with explosives.

Women, working side by side with men, have dug new ditches, and now the land can be used to grow more food for Britain.



As a result of these, and many other schemes of reclamation, vast areas of land have been brought under cultivation, and are growing fine crops or are first-class grazing pasture.

But whereas reclamation has brought under the plough much land that was previously entirely non-productive, there has been a great deal of work done in rejuvenating pasture. There has been for many years much agricultural land, mainly hill-land, known as "rough grazing". Much of this was so rough that it was wellnigh useless, but nothing was done about it. The land became practically valueless and the farmers in most cases lacked the capital to improve it.

Following in the footsteps of Sir George Stapledon, who was the originator of the plan for re-seeding the rough pasture of hill-land, further experiments in the re-seeding of such land began in Yorkshire about two years before the war and soon showed what great advantages there were in this practice. When war came it became even more necessary to improve all pastures, for as many acres of pastureland had to be ploughed up and put down to food crops, it was essential that such pastureland as remained should be improved so that it could carry more stock than hitherto.

Much of this poor pasture and rough grazing had not been under the plough within living memory. The grass, such as it was, was coarse and full of weeds, and had little food value. In many districts such land has been ploughed, cultivated, manured and sown with a good seed mixture. The results have been first class. Young stock has been put to graze on it within two months of re-seeding and has benefited accordingly from the fresh young pasture.

Many areas have found great benefit in reseeding. For example, in the West Riding of Yorkshire—an industrial area, where most pastures were so poor that they could only supply about six weeks' grazing in the year—one landowner has himself undertaken reseeding by agreement with his tenants, who have been only too willing to pay an additional 10/- rent per acre per year for all land so treated. Then again on one farm in the West Riding, as the result of the re-seeding of a pasture, the milk yield rose by 86 gallons in a month and the farmer found that he needed only half the former amount of concentrated foods for his herd.

Another source of previously non-productive land which has been tackled by the County War Agricultural Executive Committees has been the common land of England. Normally such land may not be enclosed because of the commoners' right of grazing and the people's right of free access to such land. During the war, however, the Minister of Agriculture has taken power temporarily to suspend these rights. In all, the Committees in England and Wales have brought about 16,000 acres of common land under the plough.

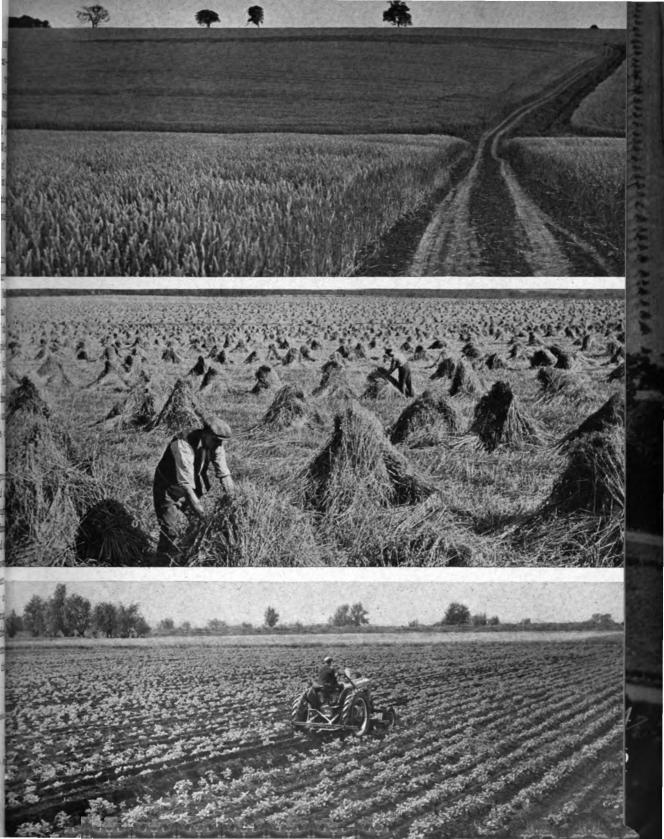
In Devonshire the Committee made an agreement with the commoners that such land as they (the Committee) ploughed up might remain under their control for a period of three years after the end of the war. At the end of that time the Committee will put the land down to grass and hand it back to the commoners. On their part, the commoners asked for no compensation for loss of grazing rights during this period for they took the long view that they would eventually get back a much better pasture than they had handed over to the Committee.

A year ago this land was just a mass of tangled bushes. Here it is seen with a fine crop of wheat.

Another fine crop on reclaimed land.

Ridging up an excellent first-year potato crop on reclaimed land.







Boys from Bemrose School, Derby, at work in a sugar-beet field.

# THE FARMER AND HIS LABOUR PROBLEMS

FROM the very start of the war farmers have been faced by a shortage of labour. The Women's Land Army has done a great deal to help, and this is dealt with in a special section, but it has not been able to solve the whole problem. Intensive cultivation calls for more labour, for every job must be done quickly. The moment, for instance, that the farmer's

crop of early potatoes is ready for lifting, he must get them up quickly and plant out the field with, say, cauliflower seedlings. The need for intensive cultivation, coupled with the calling-up of many agricultural workers, greatly added to the labour problem.

In the years before the war there had been a steady drift of agricultural workers into the towns. It is true that between 1918 and 1939 there had been a loss of three million acres of agricultural land to building schemes, roads and so on, but this loss did not account for anything like the whole of the falling off in the number of agricultural workers.

People who live in towns are prone to consider the agricultural worker as an unskilled worker. They are apt to imagine that any strong man or woman can do the work on a farm. They are, of course, entirely wrong. Agricultural workers are, in the main, very definitely skilled, and many of them are craftsmen. The ploughman, the thatcher, the hedger are all craftsmen. The shepherd, the horseman, the cowman, the pigman are all highly skilled if they do their job properly. It is, for instance, a common thing for a shepherd to receive a bonus for every lamb that he rears and thus he is rewarded according to his skill.

Apart from these specified jobs, there are many others on a farm which require much practice.

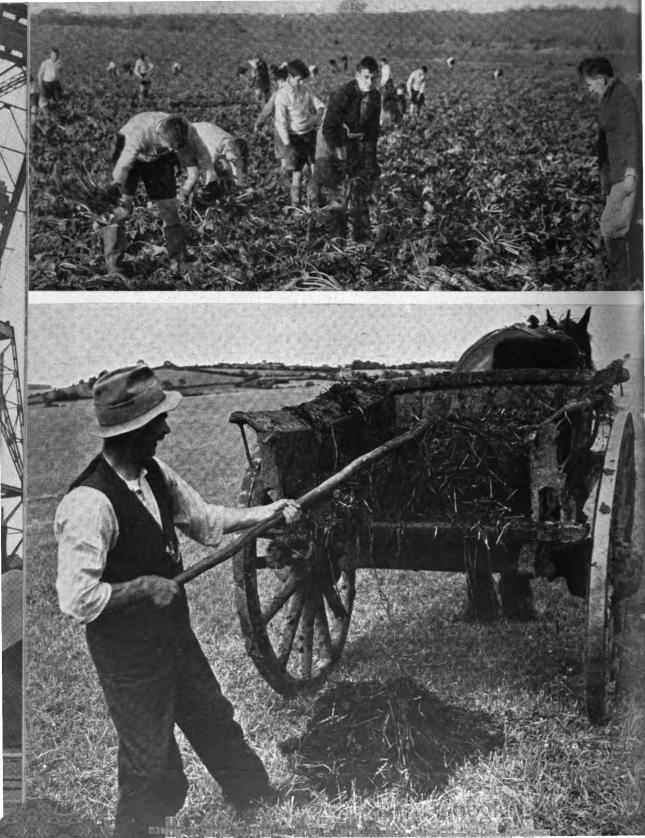
There is an art in pitching sheaves of corn, in the rhythm and speed of planting cabbages and even in the humble task of spreading manure, which does not come too easily to the beginner. In consequence the farmers found that they needed more untrained workers than the number of skilled workers that they lost.

Seasonal labour is also a problem. At certain times of the year, such as the corn harvest, the potato setting season and the potato harvest, a farmer requires extra help. Speed is often a most important factor in gathering the corn harvest, for if bad weather sets in while the sheaves of corn are still in the field, a good crop may be almost ruined, with the ears sprouting and the straw rotting.

Before the war such seasonal labour was usually obtainable locally, except in the case of the fruit and hop-picking seasons, when families lived in camps on the spot, and grandmothers, mothers and children all helped with the work—to many townspeople it was a summer

Speed is essential to Britain's war-time agricultural programme. Here a girl is ploughing the land between lines of corn stooks in preparation for the next crop.







holiday—three weeks or a month out in the open all day was a welcome change from the smoke and grime of a big city.

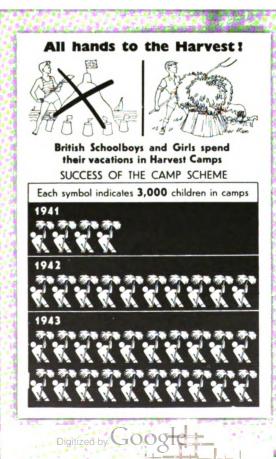
For the corn harvest the farmers called upon the women of the district and anyone else who was willing to help. But in war time there are few women who have not already got a job either part-time or whole-time.

In order to help, the Ministry of Agriculture arranged for camps for those willing to give part or all of their holiday time to helping with the harvest and also for camps for school children. In 1942 there were 650 camps for

Above left: Schoolboys help the farmer gather the potato harvest.

Left: Nothing can replace farmyard manure pasture and hay alone are kept entirely on artificial fertilisers, to avoid all risk of infection.

Above: Schoolboys at work harvesting the flax crop in Huntingdonshire.



children which were attended by about 31,000. In 1943, 61,000 children attended harvest camps, and about 120 camps were arranged for 150,000 men and women volunteers who were prepared to spend their holidays working on the land. The camps are well organised and provide a most healthy holiday. Great care is taken to see that children do not overwork and provision is made for games and other entertainments. The food supplied is a special consideration and supplies are on a priority basis.

Other great sources of help are the Voluntary Land Clubs and the Emergency Land Corps. The former consist of townspeople who work on farms in the neighbouring countryside at week-ends all the year round, while the Emergency Land Corps is formed of country people who are available for agricultural work whenever there is a special need for their services.



Women give a hand singling the sugar-beet crop.

At foot: The gathering of the harvest is a war-time job of first-rate importance. In many parts of England the Army gives a hand.





Rats are responsible, if unchecked, for the destruction of large quantities of stored grain and young crops. These Land Army girls are undergoing a voluntary course in rat extermination.

#### THE WOMEN'S LAND ARMY

As has been said, agriculture had its manpower problems right from the start. But to some extent the immediate problem was solved by the fact that on June 1st, 1939, just three months before the war started, there had come into being the Women's Land Army. During these three months five thousand women had volunteered for service in the event of war, and one thousand, five hundred of them had spent two weeks training on farms. Within a few days of the declaration of war there were a

thousand of them actually working on the land.

The Women's Land Army is open to any woman between the ages of 17 and 40 who is prepared to work in any part of the country, provided she can pass a medical examination and that, in the opinion of the Land Army representatives who interview her, she is of suitable temperament.

A skilled worker can do, with half the effort, twice as much work as the unskilled. Owing to



Left: Members of the Women's Land Army taking a course in weed control.

Below: Women can do this, too! A Land Army girl driving a monster track-laying tractor ploughing up heavy land.

this it was essential to train as many members of the Women's Land Army as possible, and arrangements were made for women to be trained on farms, at Farm Institutes and at Agricultural Colleges.

When she is placed on a farm the Land Army girl, if over 18, gets a guaranteed minimum wage of 22/6 for a 48-hour week, with free board and lodging; if she is under 18 the guaranteed minimum is 18/- per week. She also gets a uniform, the khaki shirt, green jersey, farm breeches and brown hat that are so familiar now throughout the length and breadth of Britain.



The Headquarters of the Women's Land Army are a part of the Ministry of Agriculture, and so the members of the Army are State-controlled, State-equipped and State-supervised, but, unlike the other Women's Services, they are not State-employed. Each one is employed by the particular farmer for whom she works.

It can be seen, therefore, that this is an essential voluntary organisation and that, though members promise to serve for the duration of war, they are not legally bound to do so. To many this may seem a strange system, but it has been found better to have each member as a civilian worker employed by a farmer, rather than to make each member an employee of the State, answerable to her superior officers, instead of to the farmer for whom she works. It is, in fact, a typical British system, a democratic system, a system that must puzzle Hitler with his regimented slaves.

Many farmers were sceptical of the possibilities of employing women on the land—especially the shop-girls, typists, mannequins, actresses, etc., from whom the Land Army is largely drawn. But gradually they have changed their views—indeed they have been forced to change them by what they have seen achieved.

To-day there is hardly a job on a farm in Britain which cannot be done by a woman and which, in fact, is not being done by a woman on some farm.

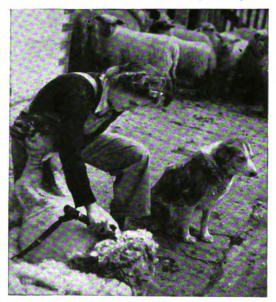
The mechanisation of farming has made great advances during the war and this has produced a big demand for tractor drivers and other operators of agricultural machinery. The meeting of this demand has been one of the big jobs that the Women's Land Army has had to tackle. Tractor driving is a highly skilled job. It does not consist merely of being able to drive, for the tractor driver must be able to plough and harrow, handle the "binder" that

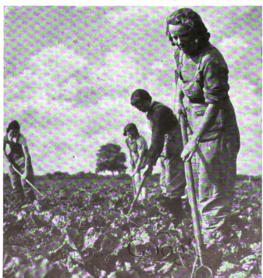
cuts and binds the corn, and many other jobs. Like so many other things it was not considered to be a woman's job before the war, but, as has happened so many times, women have proved that they can tackle it with unqualified success.

There were, of course, quite a number of women working on the land before the war,

A member of the Women's Land Army tries her hand at sheep-shearing with automatic shears.

At foot: Land girls at work in a sugar-beet field.







particularly in the dairy farming districts, and they were not enrolled in the Women's Land Army, as it would have served no useful purpose. They needed no training, they had their jobs, and they stayed where they were.

Apart from those members of the Land Army who have been placed in fixed jobs and live either in billets or on the farms on which they work, there are some members who live in hostels accommodating anything from 10 to 100, and who work in gangs and go from farm to farm, according to the need for labour.

When the Land Army has placed a girl on a farm, it does not lose interest in her. All over

Britain there are voluntary Local Representatives who visit each farm and billet at which a member of the Land Army is employed or lives, and see that everything is in order in regard to hours of work, billeting arrangements, etc. In addition, after every six months a free travel voucher to the member's home is granted, provided that the employer can spare her for a few days' leave.

A huge field of corn being cut by ten tractor-drawn binders—all operated by women.

Land girls standing up the sheaves in stooks.





#### Britain's women farmers



HOW THE WOMEN'S LAND ARMY HAS GROWN

Each symbol equals 3,000 women

1940

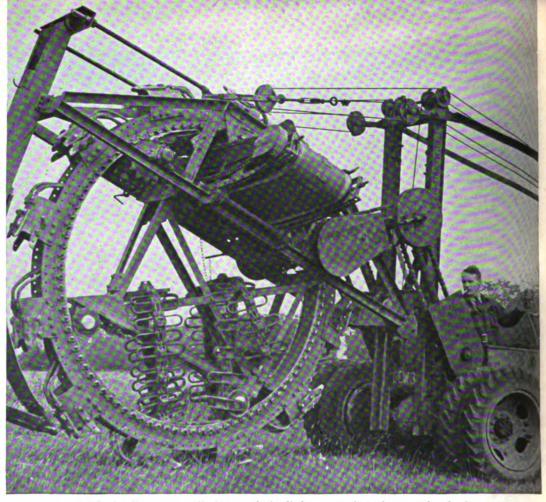
99999999

999999999**9** 999999999



Local Repre billet at the is emply ng is in a ting arrange six month r's home is can spare he

t by ten train up the shower



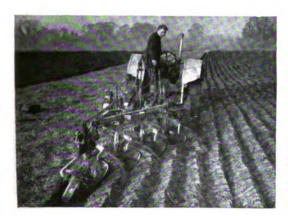
A "Buckeye" excavator digging out drain ditches on a piece of once-useless land.

### AGRICULTURAL MACHINERY

IN 1939 there were, in Great Britain, about 55,000 tractors in use on farms. The war has caused a great increase in this figure. Though there are some who adhere to the horse for farm work, it is obvious that in highly intensified cultivation the tractor has great advantages. It can work long hours, and with a change of

driver it may start work at dawn and continue late into the night by the light of its headlamps. It may be felt that whereas food for a horse can be grown on the farm, it will be necessary to import the paraffin that is burnt by the tractor, but it must be remembered that whereas a horse must eat whether it be working or not, a





IX.

tractor uses fuel only when it is at work.

After three years of war the number of tractors had been more than doubled. It was expected that there would be about 165,000 tractors at work on the farms of Great Britain by the end of 1943, three times the pre-war figure.

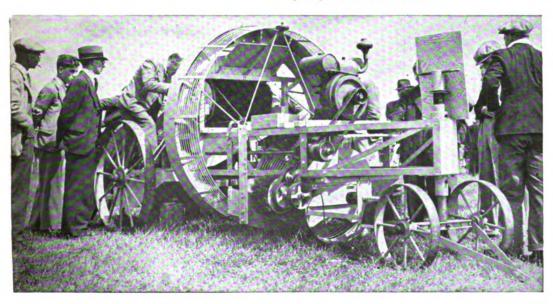
By the same time it was expected that the number of cultivating implements existing in 1942, a figure already 125 per cent. above pre-war, would have been doubled.

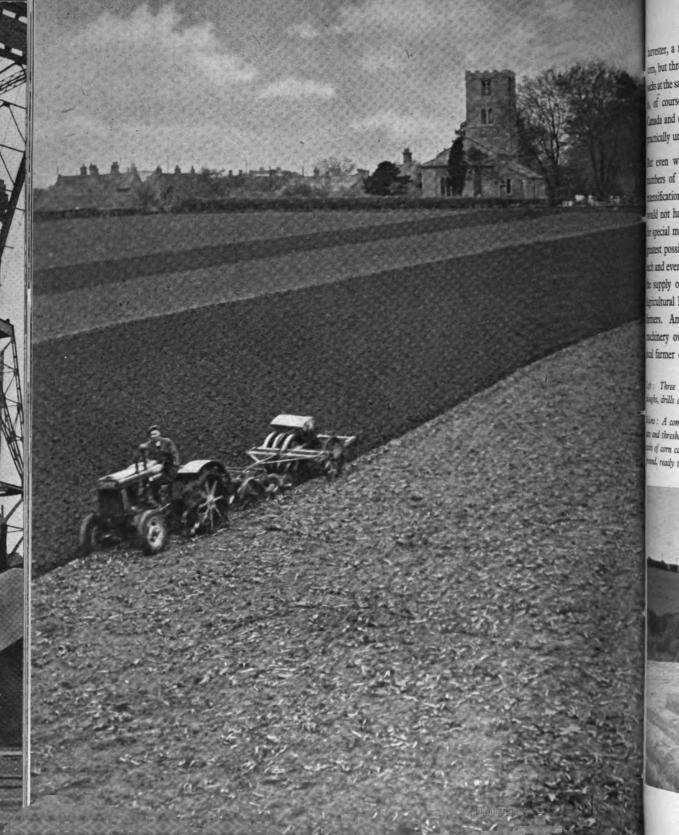
The increase in the amount of harvesting machinery has been much smaller, although it was anticipated that by the end of 1943 it would have risen by 66 per cent. There has, however, been one notable change. This is the introduction into Great Britain of the combine

Top: One of the wonderful pieces of agricultural machinery. This implement ploughs up, tops and lifts the beet and deposits it in heaps along the field.

Centre: A tractor fitted with spade lugs pulling a four-furrow plough.

Below: A new potato harvester which will clear an acre with a ten-ton crop in under three hours, pulled by a light tractor or two horses.



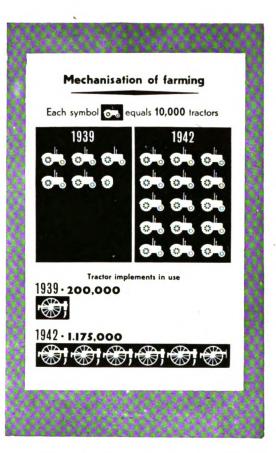


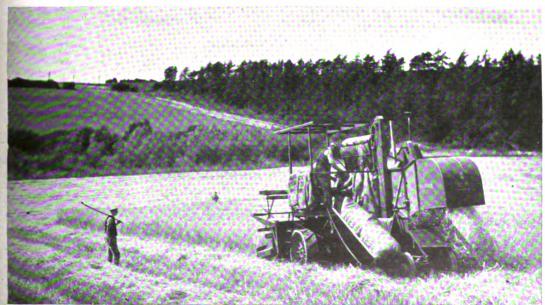
harvester, a machine which not only cuts the corn, but threshes it and delivers the grain into sacks at the same time. This type of machinery is, of course, in common use in America, Canada and elsewhere, but before the war was practically unknown in Great Britain.

But even with these great increases in the numbers of tractors and machines, the great intensification and expansion of agriculture would not have been possible had it not been for special measures adopted ensuring that the greatest possible amount of work is done with each and every machine. One such measure is the supply of machinery to the County War Agricultural Executive Committees for loan to farmers. Another is the formation of pools of machinery owned by farmers, on which any local farmer can draw in emergency.

Left: Three operations in one. This implemen ploughs, drills and harrows in one operation.

Below: A combine harvester at work. This machine cuts and threshes the corn in one operation. Two full sacks of corn can be seen sliding down the chute to the ground, ready to be picked up.







A scientist at work in the laboratory studying a potato disease.

# THE AGRICULTURAL IMPROVEMENT COUNCIL FOR ENGLAND AND WALES

RESEARCH plays an important part in agriculture. New methods and new scientific facts are frequently discovered and everything is done to pass on all new information to farmers.

It is obvious that in war time any new discovery which can help in the production of food or assist generally in the good husbandry of the land must be made use of immediately.

There is in the United Kingdom a Committee

known as the Agricultural Research Council, which is, in the main, responsible for all such research work.

In June 1941 the Ministry of Agriculture appointed the Agricultural Improvement Council for England and Wales, whose job it is to see that promising results of research are applied as rapidly as possible to the problems of agriculture and are incorporated in ordinary farming

practice. In addition the Council advises concerning problems which it considers require scientific investigation.

The farmer is often regarded as conservative because of his unwillingness to adopt new methods. In the main this is not an accurate view. The farmer, if he is to make a living out of the land, must be, among other things, a business man, and no business man will try new methods in his business unless he has reason to believe that they will benefit it.

New methods of cultivation, new systems of fertilising the land, must cost money, and most farmers are not in a position to lay out capital on improvements unless they are quite certain of a return. The Agricultural Improvement Council has done good work in the matter of encouraging farmers to adopt the latest and best methods and to take advantage of the discoveries in agricultural research.

In addition the Council has already made a number of recommendations to the Minister of Agriculture upon which he has taken action. For instance, in view of the great increase in mechanisation of farming the Council felt that it was necessary for a considerable amount of work to be done in the investigation and testing of agricultural machinery.

As a result the Agricultural Machinery Development Board was set up in January 1942. This Board arranges for the testing of machines, for demonstrations and instruction, and investigates the need for special machinery.

Another branch of agriculture in which the Council has made considerable recommendations is ley farming, the system of short-term pastures where grass takes its place in the rotation of crops. The Committee's proposals are designed to give a maximum output of food in the war years but long-term considerations are also borne in mind.

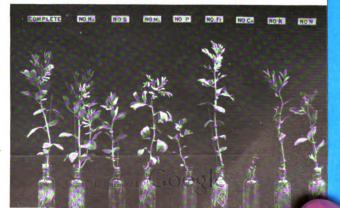


At work in the plant-testing house at Rothamsted Experimental Station.



Spraying potatoes as a protection against blight.

Experiments in the growing of broad beans carried out at Rothamsted.



The Council has also turned its attention to the "all-grass" farms which it regards as "black" areas in the matter of war production. If the grassland be ploughed up and put down to root crops, corn, leys and legumes in proper rotation it will be doing a much more useful job in the matter of food production. In addition the leys will furnish much better pasture than the old grassland and often a larger head of stock can be carried on the new pastures than the old, despite the reduction in the total acreage of grass.

There is much other work that the Council has done and is doing, but the examples given above show that every effort is made to bring the agricultural industry to a state of maximum efficiency now; and at the same time to ensure that the maximum effort is not allowed to cause a deterioration of the land that would affect the future of the industry.



Experimenting with seeds in special seed-testing laboratories.

Below: Two plots of black Tartarian oats—one treated with phosphate, and one not treated but with identical cultivation. The grower examines the difference in results.





The results of his labours. The farmer and his family, like every other family in Britain to-day, can sit down to a meal of good plain food.

### **EPILOGUE**

THE story that has been told might perhaps have been called "The Battle for Food". It is the story of a great battle—and a great victory. It has no named heroes, no medals, no brilliant feats of arms; it is a battle of hard work, unceasing toil; and though the battle has been won there can be no relaxation.

In 1939 Hitler believed that he could starve Britain into submission with the U-boat campaign. When France fell in 1940 he was certain he could. But he reckoned without the British farmer and farm worker, the men—and women—who have played their part so valiantly and have used all their skill and knowledge to produce from the land, after three and a half years of war, 70 per cent. more food than was produced in peace.

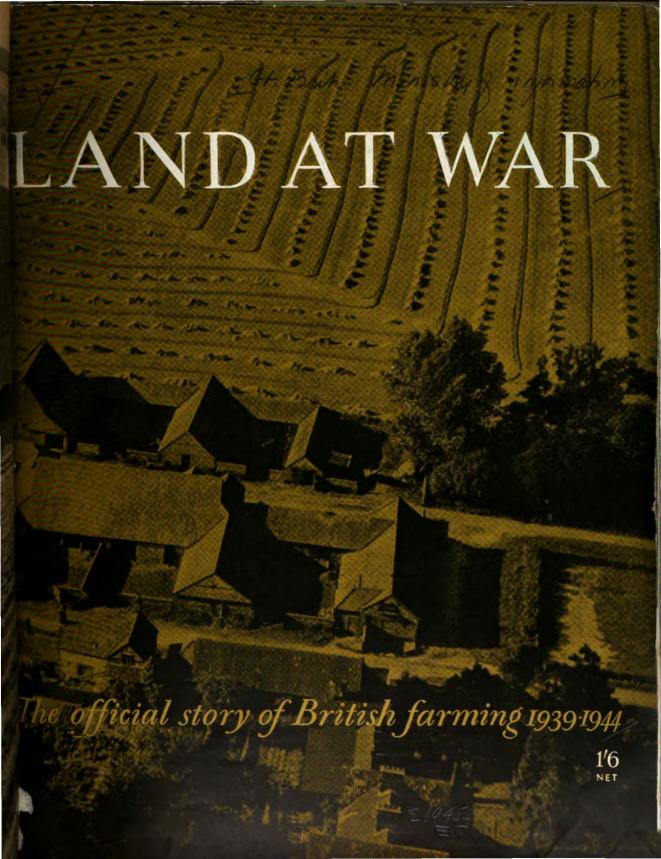
FRONT END-PAPER—The Pattern of Wartime England.

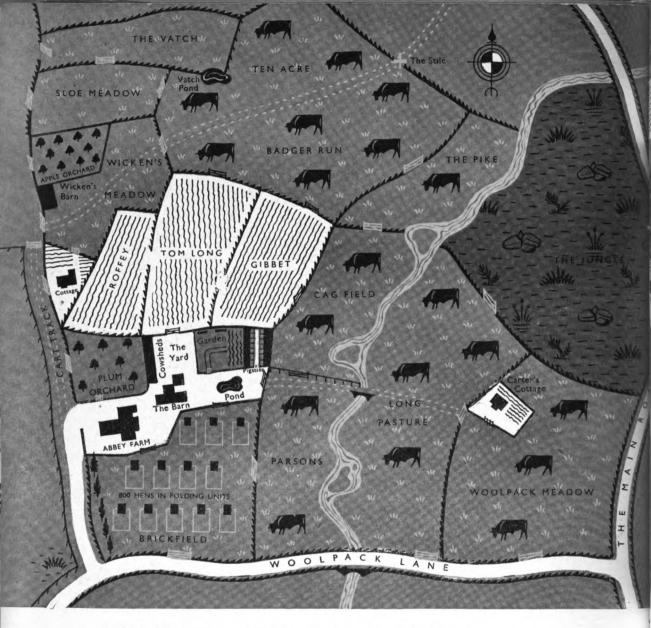
BACK END-PAPER-Ploughing at night.











### ABBEY FARM: 1939 Predominantly Old Pasture

(The facts and geography shown in these drawings are based, with slight modifications, on an actual farm in the South of England. So far as any one farm can be said to be typical, it indicates the general direction in which mixed farming has moved during the war.)

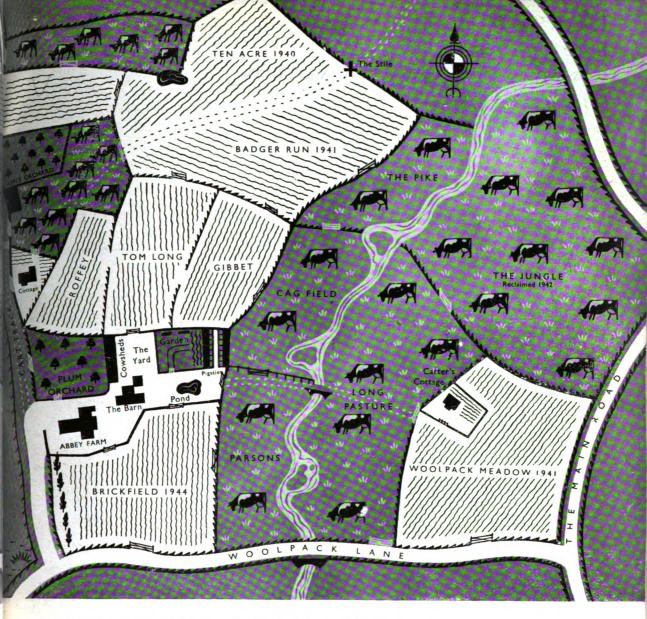
SIZE 100 acres (15 acres arable, 85 acres grass).

STOCK 20 to 40 Devon bullocks, fattening on pasture and imported cake.
800 hens in folding units, fed mainly on imported corn.
350 store pigs in yards, fattened mainly on imported meal.
2 horses.

Geese, turkeys, and occasional folds of sheep.

IMPLEMENTS I horse-plough, I horse-drawn grass-mower, horse-drawn cultivators, and reaper.

LABOUR 2 men.



#### ABBEY FARM: 1944 Arable balanced with Grass

116 acres. 58 acres arable, 58 acres grass (16 acres added by reclamation).

20 milking cows, 15 young stock, 1 bull, 25 pedigree sows and boar, 150 young pigs, 1 horse.

NTS 1 tractor, pulling plough, cultivators, 3-row potato ridger and reaper. IMPLEMENTS

LABOUR I man, I land girl. W

WAR	CROPPING	1940	1941	1942	1943	1944	
	ROFFEY	Wheat	Clover	Oats '	Beans	Oats, and 3-year ley	
	TOM LONG	Potatoes	Wheat	Oats	Roots	Oats, and 3-year lev	
	GIBBET	Wheat	Linseed	Potatoes	Spring Barley	Clover	
	TEN ACRE	Winter Oats	Winter Wheat	Clover	Potatoes	Spring Barley under-sown with Clover	
	BADGER RUN	Grass	Winter Oats	Winter Wheat	Clover	Spring Potatoes followed by Roots and Kale	
	WOOLPACK	Grass	Ploughed and slagged	Spring Oats and Peas	Winter Oats	Potatoes	
	SLOE MEADOW	Grass	Grass	Grass	Winter Wheat Grass	Oats and Beans	
	BRICKFIELD	Grass	Grass	Grass	Grass zed by	Spring Linseed	
	THE JUNGLE	Briars	Briars	Reclaimed	Re-seeded	Pasture	

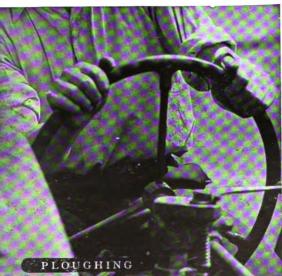


# Land at War

prepared by
the Ministry of Information

London: His Majesty's Stationery Office







# C O $\mathcal{N}$ $\mathcal{T}$

- 1 War comes to the land PAGE 7
- The return of the plough PAGE 15
- 3 Factory on wheels PAGE 22
- 4 New harvests and new men PAGE 30
- 5 Reclaiming the bad lands PAGE 38



### CROWN COPYRIGHT RESERVED

Price 1s. 6d. net from His Majesty's Stationery Office at York House, Kingsway, London, W.C.2; 13a, Castle Street, Edinburgh, 2; 39-41, King Street, Manchester, 2; 1, St. Andrew's Crescent, Cardiff; 8o, Chichester Street, Belfast; or at any bookseller.

Printed in Great Britain by THE WHITEFRIARS PRESS LTD.,

 $\mathsf{Digitized}\,\mathsf{by}\,Google$ 

### $E \quad \mathcal{N} \quad T \quad S$

- 6 The countryman's myriad foes PAGE 49
- 7 Green pastures PAGE 56
- 8 Farming in Scotland PAGE 65
- 9 Ulster: a country of small holdings PAGE 78
- 10 New life on the land PAGE 85

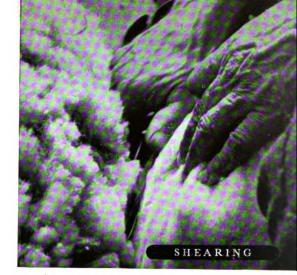


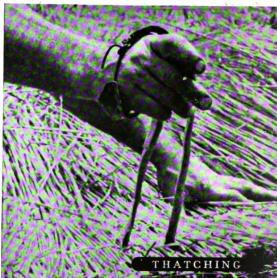
### FIRST PUBLISHED 1945

This book is prepared by the Ministry of Information with the approval of the Ministry of Agriculture and Fisheries, the Department of Agriculture for Scotland and the Northern Ireland Ministry of Agriculture.

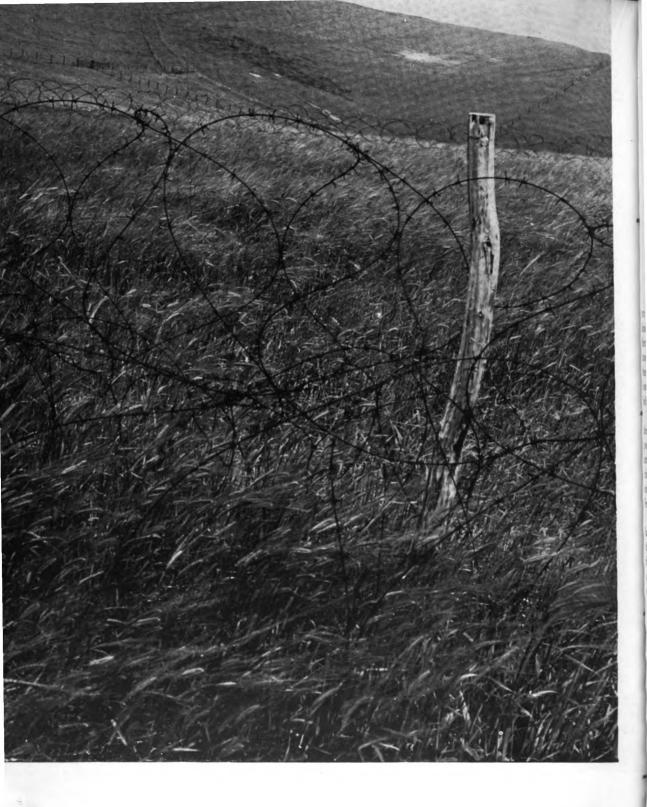
London and Tonbridge.

S.O. Code No. 70-478 •









Digitized by Google

## 1

### War comes to the land



NO WEAPON ever invented is more deadly than hunger; it can spike guns, destroy courage, and break the will of the most resolute peoples. The finest armies in the world, courageous enough in the face of bombs or bullets, can be reduced by it to helplessness and surrender.

This is the story of Britain's battlefield—the land; and of how 300,000 farms, strong-points in the battle against hunger, were armed, equipped and manned, so that the rich though neglected soil of these islands could be won back to fertility and help to feed and sustain a nation at war.

When, in 1939, we turned again to the land, we found it no more prepared for war than we were ourselves. It is true we had done very little to keep it trimmed for such an emergency. The Government had passed a number of measures to help the farmer, and the Agricultural Departments had worked hard to keep him on his feet, but 20 years of easy-going peace made that task extremely difficult, and the state of the world in general had, in fact, done British agriculture little good at all. The hungry lessons of the last Great War were too soon forgotten; we made promises to the farmer, but few survived for more than a couple of years. A large number of farms which in 1917 had only just saved us from starvation were allowed to slip back from cultivation to ranching, a process of neglect and deterioration began, and it was not a happy story.

There are few farmlands in the world more lush, more responsive, or able to bear a greater variety of crops than those in these islands; there are few men with a better natural feeling for the land than that which our farmers and farm workers possess. They are the sons of Britain's oldest industry, the inheritors of a complex and highly developed craft. With their eye for animals, their love of the soil, their capacity for hard work and endless experimentation, their genius for cattle-breeding, and their prophetic sense of the weather, they are the product of centuries of natural wisdom.

Little of this can be learnt from a book; it can only mature slowly in the brains of a long succession of land-workers who have proved by their experience the reality of what may seem to us mere guess-work or superstition, but is in fact scientific truth. Because of their long centuries of achievement British farmers had a name in the world; they had bred such excellent strains of cattle, wheat and grasses, that many vounger agricultural industries abroad were founded almost completely upon them. Agriculture, with seafaring, has always been one of the natural callings supremely important to an island people. We were never foolish enough to lose our mastery of the sea;

it seems all the more incredible that we should have forgotten our need for the land and allowed so much of it to deteriorate between the wars.

There were still, of course, many farmers in this country who were both modern and progressive, and were running their farms in the best possible traditions. In spite of the hard times, these farms endured by the merits of the men who ran them, and were to form a valuable advance guard, when war came, in leading the whole industry forward into war production. There were times, however, when they appeared rather as islands of good fortune in the general apathy from which the countryside was suffering.

Before the war, of the 48 million people packed into these islands, only about one million families were engaged directly in the production of food. Of the remainder most were concentrated in the cities. It is obvious that, with such a vast urban population to feed, Britain could never be wholly selfsupporting, and the existence of those dependent urban millions constituted one of our gravest national problems. Influenced by the readiness of foreign countries to provide us with cheap food, we allowed our home production to fall far below the margin of safety. Prices dropped, and many a farmer, with little encouragement to grow crops except on the best land, concerned himself chiefly with cutting down expenses by turning to livestock farming on the ranching system. In the worst instances the fields became little more than exercising yards for this stock. Fed almost wholly upon imported food and owing little to the land they walked on, cattle were merely incidental to a process which turned the raw material from abroad into milk and meat. Many farmers were forgetting the use of the plough altogether; they were becoming no longer cultivators of land, but cattle-ranchers.

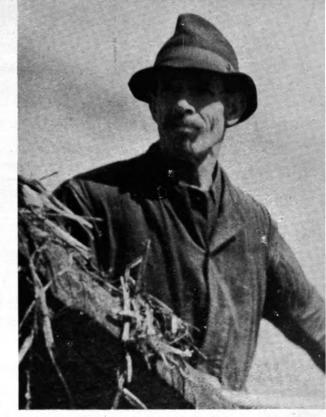
Black as this picture is, it does not, of course, relate to the whole of British agriculture; but it does express something of a

disease which was world-wide and had begun to strike seriously at the weakest links of our home industry. It was a problem with which the Agricultural Departments had been wrestling for some years. Much had been done to alleviate it. Subsidies and import quotas, and the vast marketing machinery built up from 1930 onwards, were by no means a wasted effort. During the decade which preceded the outbreak of war, these measures evolved and became the basis for a well-organised system of marketing and distribution of some of our agricultural products—a system which was more or less ready by the time war broke out. Efforts had been made, too, to build up fertility, and to accumulate a reserve of machinery for a time which some felt was bound to come. But because of the general apathy on the part of the layman these efforts, valuable as they were, had not achieved that degree of readiness which agriculturists would have liked, and when war did come, the Agricultural Departments were still faced with many serious problems.

This, then, was the situation—Britain depending for over 60 per cent. of her food-stuffs from overseas sources, and her supply lines in danger of being cut at any moment; a vast population of soldiers and factory-workers to be fed; and much of the land out of heart and in a worse condition than it had been for many years. How, then, to avoid starvation? How, with too few tools, and with labour short, to plough the land, feed it, and cajole it back into good humour so that once again it might bear us ample crops? That was the problem.

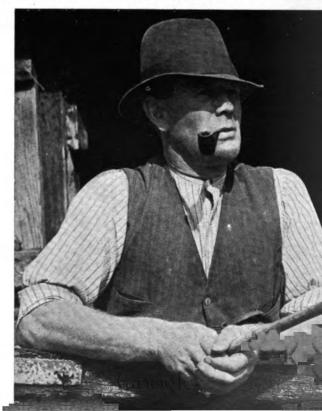
It will be difficult to forget the strangeness of that first September: the breathless days of Indian Summer pregnant with news of war, the heat haze over the yellow fields, and the silence of earth and sky. The countryside was not to know that silence again for some years: gradually those skies began to shake with our heavy bombers, huge tanks would squeal through the narrow





". . . with their love of the soil, their eye for animals, their capacity for hard work . . . "









BAD TIMES. Twenty years of peace were not kind to every farmer. Tumbledown buildings, idle tools, fields strangled by weed and flood—these were legacies of ill luck, bad markets, slump. This had to be made good.

Digitized by

dusty lanes, and the fields themselves become a day-long clatter of drill and tractor, the tools of the land's offensive.

But in those early days there was none of that; the land lay listening, waiting for something to happen. It did not wait long. Already German submarines were out in the Atlantic, nosing across our searoutes; and the explosions which shattered the hull of the Athenia came reverberating through the summer air, over the fields, up and down the quiet valleys like a note of warning. The blockade had begun.

Once more, then, Britain was alone, an island in the North Atlantic, packed with millions of people subject to the peril of starvation. No one knew just how real that peril might be. Suddenly all the overseas foodstuffs on which we relied became uncertain. We no longer knew whether we should get any at all. And once again we turned to the farmer for salvation.

The immediate job was to get as much land as possible ploughed up and planted by the following spring. The national larder was threatened, and thousands of tons of corn, potatoes and cattle fodder had to be found to fill it. There was not a moment to lose, for the need was urgent, the year was growing old, the land had to be ploughed and winter corn to be sown before it was too late. Every farmer was waiting to enter the battle, to be told his station, and put to the test. Not a moment was lost, for the Agricultural Departments had their war plans ready and brought them into action right away.

To start with, the Government needed leaders, men of example and imagination, men who had dirt on their boots, who knew the land; men, moreover, who spoke the tongue of the farmer, who knew his life and problems, and in just what way to ask for the impossible thing. For much that was formerly impossible had now to be done. Fortunately such men were not hard to find, and all over the British Isles the toughest

and most practical farm men in every county had already been chosen and formed into Committees to organise and inspire the work of their particular area. At the same time a Women's Land Army Committee was appointed for each county and empowered to find local representatives, whose job it would be to watch over the welfare of the land girls coming into their district.

On Sunday, September 3rd, these War Committees were called by telegram to immediate action, up and down the country. They were empowered by the Minister of Agriculture to enforce his special wartime measures. Yet theirs was a form of selfgovernment, and their brother farmers, knowing that these powers would be exercised not by some band of remote officials but with the sympathy and understanding of their own kind, were the more content and the more willingly co-operative. Farm workers' representatives, who also sat on these Committees, gave helpful advice on labour matters and encouraged the workers in their efforts.

The Committees set to work without delay. They met in village inns, barns, town halls and farmhouse kitchens. They kept their talk short, for the time was short, and they had to get back to their fields. But each knew he was in the battle at last, and when he returned to his farm that night he had all the responsibility of his district upon him, and a list in his hand which said: "10,000 acres wheat, 6,000 acres potatoes, 1,000 acres sugar-beet, etc.", or more, or less, according to the size of his district. This was his immediate objective, and as he looked round the local landscape of unploughed grass, he may well have wondered if next spring would really see so many things growing, for no other spring had done so in 20 years. But that night or the following day he went round among his neighbours and showed them the list, and when they had all finished laughing, one or the other would say: "Of course it might be done, but I'm hanged if I can see how ".

Teagn real. E. in wad monto de la suit de la serie de la serie de serie de serie de serie de la serie

DOMESDAY BOOK 1066, in which William the Conqueror reviewed the wealth of his new conquest. Above are listed the ploughs, cattle, "hides" of land, which he found at Hendon.

Later, District Committees were formed with, if possible, a representative from every parish, and they put their heads together and in the end every local farm and field knew how best it could play its part.

That is how the somewhat prosaically termed County War Agricultural Executive Committees came into being. not let that word "Committee" mislead you. Here was no talk-shop, but a hardbitten band of fighters who had a very real and critical battle on hand. Their first job was to bring in the straggling peacetime harvest as quickly as possible, to clear the tangled fields for action, and get two million extra acres of land ploughed up and under crops by the following year. This they achieved by what is perhaps the most successful example of decentralisation and the most democratic use of "control" this war has produced.

From Whitehall to every farm in the country the C.W.A.E.C.s formed a visible human chain, a chain which grew stronger with each year of war. Here, roughly, is the way it worked. The Government might say to the Minister of Agriculture: "We need so much home-grown food next year". The Minister assured himself that the labour, tractors, equipment, and so on, would be forthcoming, and said to the Chairman of a County Committee: "We've got to plough two million extra acres next year. The quota for your county is 40,000".

The Chairman said to his District Committee Chairman: "You've been scheduled for 5,000 acres".

The Committee-man said to his Parish Representative: "You've got to find 800 acres, then".

And the Parish Representative, who knew every yard of the valley, went to the farmer at the end of the lane.

"Bob," he said, "how about that 17-acre field—for wheat?"

And Farmer Bob said "Aye".

For the C.W.A.E.C.s, instead of issuing orders from the remote anonymity of a Whitehall desk, went out into the fields, into the barns and cowsheds, into the pubs and market-places, and talked, argued and pleaded with their fellow-farmers to produce what was needed. The result more than justified these methods of peaceful persuasion, and was a testimony to the public spirit and adaptability of the British farmer.

Thus the Agricultural Committees went to war, and with them a tough but independent army of farmers and workers, an army that had not only been through a bad time, but were then very short of the weapons for the difficult battles facing them. It was the task of the Committees to inspire that army, equip them, and show them what must be done. The old, independent peacetime methods of farming would not do any more. The job on hand demanded completely new

methods, modern methods, such as some farmers had not even heard of.

To help the Committees, the Government provided them with a staff of experts, under an Executive Officer, to spread these modern methods, to explain and popularise them. New personalities began to appear in the countryside: there were the Cultivations Officer, the Technical Officer, experts on silage, straw-pulping, ley-farming, farmdrainage, milk production, machinery, fertilisers, pests, and plant and animal diseases. Apart from the voluntary, unpaid Committeemen who were the prophets of the new farming, and who gave up all their spare time to the job, the Ministry of Agriculture roped in the best technical brains in the country: scientists, specialists, and young men whose studies of some particular branch of husbandry had taken them all over the world, to supplement its overworked nucleus of experts. It was the farmer's job to produce the goods, but he now had at his disposal the free advice and assistance of these experts on every conceivable problem.

With so much to be done, we had to have a full knowledge of our resources. Later on, a National Farm Survey was begun—a second Domesday Book—to record the state of every farm in the country. Nothing like this had been attempted since the eleventh century, when William the Conqueror set out to discover the wealth of his new conquest.

"Then sent he his men all over England into each shire commissioning them to find out how many hundreds of hides were in the shire, what land the King himself had and what stock was upon the land, or what dues he ought to have by the year from the shire."

But the aim of this present survey was somewhat different. Agriculture at war had to know the exact strength of every fighting unit. Hundreds of field-workers, mostly volunteer Committee-men or retired farmers, began the gigantic task of surveying every holding with more than five acres of land. They covered every shire and parish; they

#### B. CONDITIONS OF FARM.

1. Proportion (%) of	Heavy	Mediun	1   Lig	ht	Peaty	
area on which soil is		45	2	25		
2. Is farm conveniently	laid ou	t? Ye	s		X	
Moderately						
		No				
3. Proportion (%) of f	arm wh	ich is	Good	Fair	Bad	
naturally			65	35		
4. Situation in regard to	road		X			
5. Situation in regard to	railwa	y		X		
6. Condition of farmhou	se		X			
Condition of building	s		×			
7. Condition of farm roa	ds			X		
8. Condition of fences				X		
9. Condition of ditches			X.			
10. General condition of	field dra	inage		X		
11. Condition of cottages			-	×		
					No.	
12. Number of cottages v	vithin fa	ırm are	a		2	
Number of cottages e	lsewhere	e			0	
13. Number of cottages le	et on se	rvice te	nancy		-	

FARM SURVEY 1940. Nine hundred years later, as a new invasion threatened, Britain made a second survey. Every farm was noted, with the state of its buildings, roads, fences, and its soils.

worked with 6-in. scale ordnance maps, tact, circumspection, and plain physical stamina. For they not only had to assess the qualities of the land, they had to sum up the qualities of the farmer himself.

In the end, they had searched thousands of square miles of country, recording in detail the condition of each farm, the state of the land, the types of soil to be found there, the acreages of crops, acreages of grass, and the areas of dereliction. They had noted, too, the state of buildings, cottages, cartroads, fences, ditches, drains, water and electricity supplies; the degree of infestation from rats, rabbits and other pests; and whether or not the farmer was a good one.

Britain is not so well known as we imagine it; main roads have worn a familiar track across particular stretches of country, but away from these you are often in lands and valleys unfrequented, and unchanged by the years. All these were explored at last, many strange facts discovered, and many old mysteries cleared up. Grazing lands, held in trust by villages, about which no documents existed nor any proof but the proof of tradition, were noted down for the first time in centuries.

But particularly the good farms and the bad farms were noted, and the reasons for the latter recorded—lack of adequate roads, lack of lime, etc.—so that steps might be taken to improve them. The job took a long time, but it was not attempted out of mere curiosity. There now exist detailed maps upon which, outlined in different colours, 300,000 farms are marked and known. This Farm Survey may well eclipse the Domesday Book not merely in comprehension but in historical importance: it not only provided invaluable data for the wartime

mobilisation of our resources, it has helped to establish a blue-print for post-war agricultural planning.

But long before this Survey started, the great ploughing-up offensive had begun. County Committees, having allotted targets to every farm, began to organise labour for those who needed it. And the farmers, clearing their peacetime harvests, or those without harvests at all, began to look to the approaching winter of 1939-40 as a time for unprecedented activity. Two million acres of old grassland had to be turned over in a few months, had to be turned face downwards so that frost could work upon the weeds and grubs, could break up the soil, clean and prepare it for the first wartime crops upon which so much depended. It was a bitter winter, harsh and uncompromising, but for the farmers of Britain it marked their first victory.

PLAN OF OPERATIONS. Farming is a battle against time and weather. Crops must be planned, labour and machines organised, seed sown at exactly the right moment. The land does not wait.



## The return of the plough



THOUGH the sword has long been a symbol of war, the ploughshare one of peace, to-day this symbolism is no longer true. For in the hands of the modern British farmer the plough became simply another weapon of war, playing its own specialised part among the deadlier armament to which the sword itself had given place. Invention complicates both life and battle, but the physical needs of a besieged island remain very much the same, and old problems recur in each new moment of crisis.

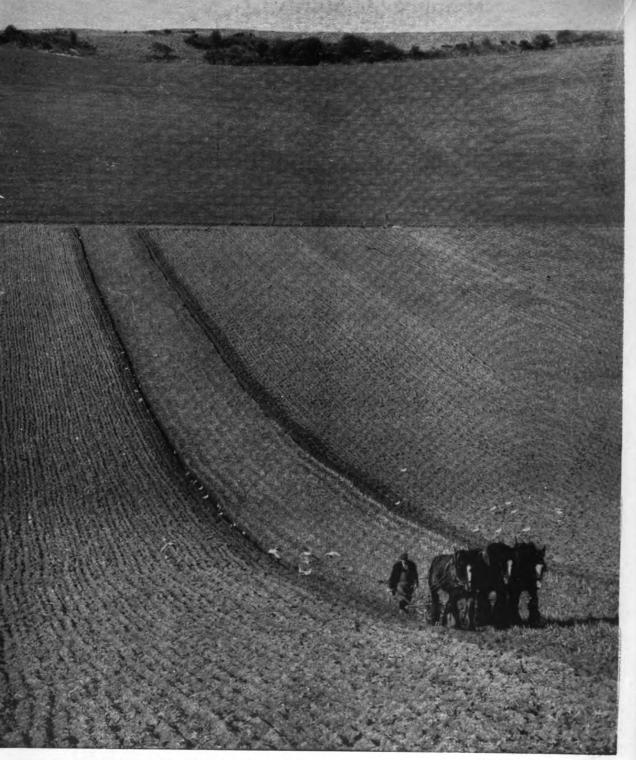
It is a long time since the Spanish Armada swept with so much bluff and bullheadedness up the English Channel; but for us, in 1939, the situation was very similar. As flaming beacons greeted the Armada and spread their warning from hill to hill, rusty swords were taken down from the walls and polished for battle. Queen Elizabeth, gazing upon the quiet sheepwalks of the countryside, knew the danger in their idleness and persuaded the farmer, by forcible methods, to bring out his plough and look to his land again.

In 1939 the threat of starvation was just as real, but our own farmers, unlike those of Elizabeth's day, were keenly aware of the country's need, and of the necessity for getting more land under cultivation. The Government was offering a small grant towards the cost of ploughing each new acre of land, but this, of course, was no more than

a token to the farmer. For a sudden return to the plough cannot be undertaken without at least temporary hardship. Switching from the regular profits of milk production to the long-term process of arable cultivation upsets for a time the whole economy of the farm; it means hard months of labour with no immediate reward, and always the risk of crop failure or some such disaster.

Yes, there was more to it than the paying of subsidies. You can't plough a field with a pound note. Thousands of skilled workers had been taken into the army, the weather was bad, ploughs were scarce, horses scarcer; nor were there nearly enough tractors. But the job offered such vast opportunities that even the most serious difficulties were overcome. There were large areas of permanent grass and rough grazing in England which the plough had not visited for years. of Wales was in a like state, though wilder, her mountains and valleys given over almost entirely to sheep and cattle breeding. Even among the best farms there were fields it had not paid to cultivate till now.

It was against these millions of ripe but ragged acres that the plough-up offensive was directed. Dunged by generations of cattle, enriched by years of rotting and undisturbed turf, fertility lay like a priceless vein beneath the surface, waiting only for the plough's knife and the farmer's skill to



THE PEACETIME STUBBLE, and the untouched grass, each was ploughed in turn, ready for the first crops of war. And wherever the teams went out the gulls followed, foraging in the open furrows,

Digitized by Google

release it and turn it into bread. Hardly ever before in his history had the British farmer been faced with such a task or such an opportunity; it was gigantic both in difficulty and promise. But the need of the country created the will to ignore difficulties. They were nothing compared with the urge to get the land opened up.

Every implement, in no matter what condition, became a treasure without price. Old ploughs were brought out, oiled and renovated. In a shower of sparks and clamour the local repairer and the village blacksmith came into their own again, sharpening plough-points, linking up chain harrows, refitting broken shafts, and forging new blades for the struggle. Old harness was cleaned and cobbled; horses teamed up; and the garages of the small towns began to attack the novel problems of tractor maintenance.

Early in the autumn of that first year the general offensive began. The first teams looked rather small setting out over those miles of grass; the furrows they left looked slight compared with all that had to be done. But slowly the countryside began to change; the dry yellow old grass sank beneath the waves of heavy loam thrown up in field after field. Green pastures broke into vivid patches of vari-coloured earth which grew and spread and joined with each other. The land began to assume a new fabric, a texture and richness much of it had almost forgotten. And the old men would look out across the fields and say: "They bin and ploughed the meadow, look. Ain't seen that done since the last war. Well I never".

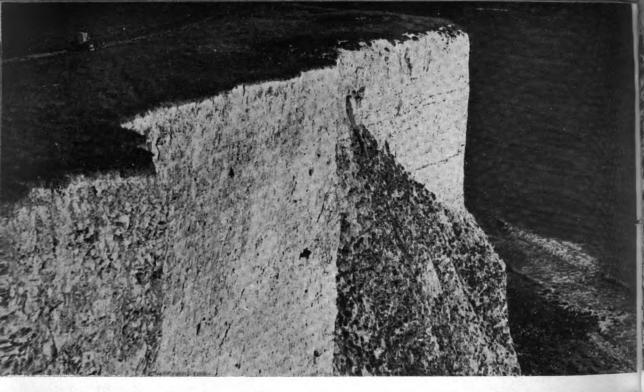
All this happened in its own time, in the time it took to share out the tools available. The farmer might have to wait, impatient at the passing of a bright day. Then his neighbour would arrive offering his plough, his horse, or his tractor. Or teams of contractors would come hot-foot from another job, the men hard-driven, in demand everywhere. In the first few weeks it was a case of

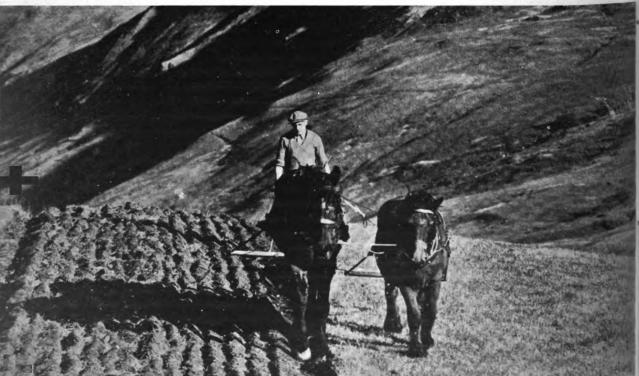
each doing his best alone, or getting help wherever he could. Soon, however, things became easier and the County Committees were organising their own forms of contracting service. A nucleus of machinery was put into their hands and this they sent out with its own labour crews wherever it was needed, tackling the work of cultivation in districts where farmers were short of equipment or where contractors could not cope with the task. Later they arranged to hire the necessary implements to farmers and contractors direct.

As the campaign developed, Committee offices came to be like military headquarters. Wall maps, dotted with a multitude of flags and coloured pins, showed the position of machinery depots, the movements of mobile units. The telephone rang continuously-accidents, breakdowns: a man in trouble, sick, unable to reach his objective; the nearest unit would be moved in to his aid, reinforcements sent elsewhere. To save time, and to prevent the overlapping of journeys, a complex strategy had to be Time, and the most effective observed. placing of equipment, were of supreme importance. Tractor drivers worked till they were fit to drop, land girls shared their hardships, and the farmer spared neither them nor himself.

But in this first season of 1939-40, before the W.A.E.C.s had fully organised their machinery depots, it was a question of every man for himself. Horses and men had to break off sometimes and rest, but an idle tractor in those days was an abomination no one would stomach. Wherever possible they were manned in shifts, and at mealtimes relief drivers took over when such were available.

Early in 1940 there came prolonged frosts which held up all work on the land for weeks at a stretch. It looked as if the job would never be finished; but when at last the frosts lifted, ploughing began again with a vengeance, the men worked seven days a week, all day and sometimes even in the dark.





THEY PLOUGHED THE HILLS AND VALLEYS, THEY PLOUGHED TO THE VERY EDGE OF THE SEA.

Digitized by Gogle





THEY PLOUGHED BY DAY AND BY NIGHT, THROUGH ONE OF THE HARDEST WINTERS IN LIVING MEMORY.

Digitized by Google



ON THE SOUTH DOWNS, unfarmed since the days of the Saxons, the modern plough appeared.

Night ploughing, though never a very common practice, developed, when necessary, its own special technique. It had to; for, even in daylight, ploughing is a tricky business; you need a clear and confident eye for it. But to plough at night is like a blind man walking a tightrope; shadows deceive you at every turn, you lose your sense of direction, and to control your machine and keep your furrow straight you need the instincts of both owl and acrobat. But experienced ploughmen soon developed a sixth sense; they got used to ploughing by moonlight, and when there was no moon they worked to a special system of lights: one fixed low on the front of the tractor and screened to light up the furrow, and another—a lantern-hung in the hedge before them and moved after each cut to give them direction.

But it was a strange business; it had that quality of eerie beauty which so much nocturnal wartime activity possesses. Like searchlights, flarepaths, the floating stars of night-flying aircraft, these lighted tractors were but part of the new pattern. Crawling along the sides of a hill, their lamps shining through the bare trees, they looked like glow-worms moving through grass. The muffled sound of their engines, rousing the winter darkness which would otherwise have been so still, brought home to the countryman the restless urgency of those days.

From coast to coast now the ploughs were fanning out over new ground. They were climbing the Lower Pennines, breaking the Devon moors, sweeping long brown paths over the Berkshire Downs, and threading their way between the derelict bungalows of Sussex holiday camps.

The old skill in horse-ploughing still played an important part; but a new skill was being born, and the tractor-plough, drawing two, three, even five furrows, began to show more than ever before its remarkable power and speed. For one tractor does the work of many horses and men. Fitted with caterpillar tracks, it can climb hillsides hitherto unploughable, and drawing the heavy blades of special ploughs can tackle rough ground no horse would ever look at. Yet the horse and the tractor are not enemies. To the delight of some of the older farmhands, the horse can still do things impossible to the tractor; an awkward corner, a tricky gradient or hollow—here it is still most effective.

For the men who worked with horse or tractor through that first winter it was no easy life. Like their brothers in the factory, they often did seven days a week for weeks unbroken. They worked through the most bitter weather, by daylight, moonlight and lamplight. They worked exposed to one of the most severe winters within living memory, and were often held up by ground which seemed as hard as rock. Horses would sometimes be found with their tails frozen to the stable floor, tractors would have to be thawed out with blowpipes, plough-points

would snap off in the iron soil. Men were frost-bitten and snow-blinded; freak storms killed birds in mid-air, split open trees, and wrapped thick coats of ice round every twig and blade of grass, so that the slightest movement of the wind played them like a xylophone. Such weather was a grave hindrance to operations.

His life has hardened the land-worker to such trials; but for many hundreds of land girls fresh from the offices, the centrally heated shops, the soft life of the city, they were an ordeal which only enthusiasm could overcome. Even during the great thaw it was little better for them. For, whether you are stumbling behind a plough or perched high on a tractor, you cannot for a moment escape the temper of the elements. If you are walking on heavy land, you wear a ball and chain of mud which you drag wherever you go. And you have to scrape down the plough after each furrow; or the horses'

hooves, or the tractor wheel. If you are on high land you might as well be at sea in an open boat; the wet winds come at you from every side, you are soaked with rain, while you feel the whole winter drain through your bones.

But, in spite of everything, the huge programme began to be achieved. By the spring of 1940 the job was done, the land lay ready for the first wartime sowing—two million new acres of it. Soil of many types and degrees of goodness. Boulder clay, Sussex chalk, Cotswold limestone, black Lincoln peat, Essex gravel, red Severn sandstone—all carved and cut and sliced and broken despite a savagely unfriendly season.

Looking upon those patchwork fields, new sign of the land's good heart, the farmer, his workers, not least the land girl, knew the cost and satisfaction of their accomplishment. The first line was taken, ready for consolidation. It was land the war made precious.



### Factory on wheels



THE WINTER CORN survived; the spring wheat grew strong and lusty, spreading broad sheets of blue metallic leaf over the fresh ground. Here was a visible promise of the harvest to come, something real to justify the bitter months now past. But there was already more to be seen there than the mark of the plough. Other signs began to appear of even deeper significance—the sight of unfamiliar machines working the sprouting fields, cleaning, rolling and cultivating.

A hundred years ago power came into industry; the railroad replaced the packhorse, the steel foundry the blacksmith, mass-production the craft of the individual. Smoking cities spread out and dominated vast areas of country, drawing thousands of rural workers into the factories. Agriculture was left in a state of isolation by this upheaval, cut off from the industrial community by an ever-widening gulf of different traditions and experience. The application of power to the land was to bridge that gulf, was to compensate for the drift of men from the land, attract fresh blood to it; was to increase both the scope and tempo of agriculture and bring it into line with other forms of human activity-particularly war.

This change had already begun to manifest itself; war merely speeded up its development. The old inherited principles of good husbandry remained, but mechanisation was giving them a special twist. The whole direction of British farming was changing, not only in its capacity to work more land with less labour, but in the type of crops to be grown, the type of cattle to be raised, even in the methods of feeding them.

The problems of intensive cultivation have always been labour and time. Crops have to be planted at the right moment, or they may never flourish. And where the climate is as unpredictable as it is in Britain, the right moment has to be seized and exploited to the full, for it may not come again. Even if there is an abundance of physical labour, each man has only so much strength, and the day is only so long.

But the time had come to ignore such limitations. Complex and critical operations had to be carried out in a very short time, vast areas planted, worked and harvested. The farmer was faced with a severe test; and it was the machine that helped to solve problems both of time and accomplishment by extending enormously man's power over land.

By 1939 the mechanisation of agriculture had already reached a high stage of development abroad. The enormous farmlands of America, Canada, Australia, and the Soviet Union, presented problems of space which could never have been solved without the



TRACTORS ON PARADE. New from a British factory, they will give the farmer power for ploughing, sowing, reaping and threshing. They lead the mechanised regiment of agriculture.

use of great technical skill and imagination. Powerful and ingenious machines had long been in use there, designed to cope with all the complicated processes of cultivation in fields often larger than an English parish. Millions of fertile acres in the Ukraine, the Canadian wheat-belt, the American Middle West, would never have been cultivated at all without their aid.

To Britain, on the other hand, mechanisation came comparatively late, though its principles were already well established by the time war broke out and big strides have been made since then. By 1944 this country had over 175,000 tractors, compared with 55,000 in 1939. After the first five years of war Britain possessed one of the most highly mechanised agricultures in the world.

This was due largely to two things—the efforts of our own home industries and the generosity of our friends and allies. Inspired by the country's need the numbers of Britishmade tractors and other farm implements increased by leaps and bounds. Raw materials were scarce and the programme of war gave priority to the production of tanks, guns and other munitions. Labour was short, and skilled engineers practically unobtainable. Struggling continually to get the right materials and to maintain their labour force, the factories did a good job—far better than could ever have been expected in the circumstances.

The material help given by America and the Dominions was tremendous. Throughout the U-boat campaigns of 1941, and later,



PERIOD PIECE. The chattering saw-tooth blades of the old horse-drawn mower is a sound that has not yet died from our summer fields.

large consignments of machinery came over the seas. They came from Canada under Mutual Aid, from Australia also, and were among the Lend-Lease cargoes sent from the United States. They were shipped wherever there was a spare foot of space, on deck, or crated down in the deep holds with the heavy armament of tanks and guns; the space was not begrudged them. For these tools were to play an important part in the Battle of the Atlantic; they were to continue that battle on the soil of this country. Carried from port and factory, dazzling the eyes in their multi-coloured paint, these ingenious, complicated contraptions must have intrigued the ordinary man. For there is nothing so gay and gaudy, so fantastically shaped, so unlike anything else in the world as a piece of new farming equipment straight from the factory. But to the farmer who knew their uses they were the answer to many riddles, the means to accomplish the hitherto impossible.

No time was wasted in putting them to good account. They were sent out by rail to all parts of the country, lending a jaunty air of carnival to the dusty wagons upon which they rode. Many of them, unfamiliar to this country, were first taken and put through rigorous tests—a new type of plough, the prairie-buster, was tried out on a mountaintop in Wales: 'they were then distributed carefully among the farmers, the dealers, and the machinery depots of the County Committees.

Take a look at a typical Committee depot. Its home is a branch-line engine-shed in a small market town. The cindered yard looks as if a tank battle had been fought there; it is a mess of black mud torn up by passing tractors. The long shed contains a whole family of machines of all shapes and sizes, some draped with tarpaulins, some stripped for action; a mass of chains, sprockets, cogs,



shares, spars, hooks, blades, revolving rakes and discs. Some look like early flying machines, some are as sleek as racing cars.

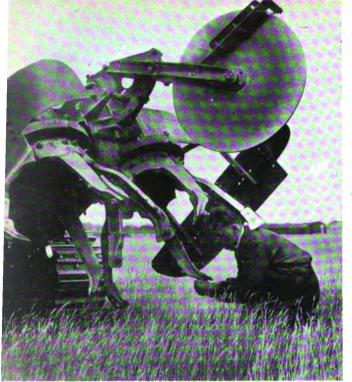
It is early morning. Mechanics are adjusting a seed-drill; they are skilled men, and their job is a full-time one, for the land gives hard wear to the toughest machine. Spare parts of all kinds are stacked near by; parts for tractors, ploughs, harrows, binders, threshers; of all shapes and sizes, from wheels and lengths of caterpillar track to plough-points and nuts and bolts. All are carefully labelled, for many are irreplaceable essentials without which the most costly machine would be of no more use than a piece of broken fence.

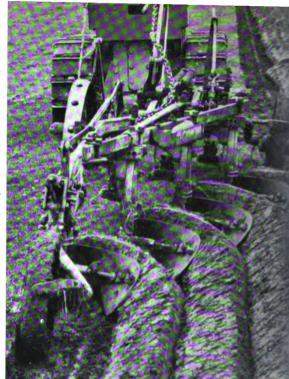
A group of land girls arrive, laughing and

They start up their tractors, chattering. mount them and drive away, one after the other, each with a train of rattling equipment hooked on behind. One is going out to the lower hills to plant potatoes. Two others, dressed in oil-black overalls and mounted on a strange-looking machine with crawler tracks, are bound for the wet valley to work on a drainage job. This machine is a Cub excavator; it has a terrific, lurching power and a long snout armed with jaws and teeth of steel. It is astonishing that a machine of such size could be operated by girls at all. But these you see are chosen for their mechanical aptitude and given a special course of training by arrangement with the manufacturers. This excavator is used for digging and

COMBINED OPERATIONS. Cutting through the wheat in broad sixteen-foot swathes, threshing and bagging the grain in one continuous movement, the combine harvester makes short work of harvest.







#### TEETH OF THE GYROTILLER.

cleaning field ditches; it can replace a whole gang of men, its jaw scooping out deep canals with speed and precision, and preparing the way for the work of other ingenious drainage tools such as the mechanical trencher and the mole plough.

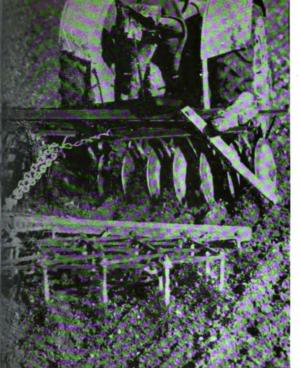
This mole drainer is a subterranean tool. It is fitted with a heavy blade and a torpedo-shaped piece of steel—the "mole"—which is used to force a series of channels beneath the ground, linking the field with the piped mains which in turn carry the water into the ditches. The operation of mole-draining calls for enormous pulling power, which only the heavy crawler tractor can exert. Drainage work is some of the toughest farm work there is, and though some girls can tackle it, it is still largely a job for men.

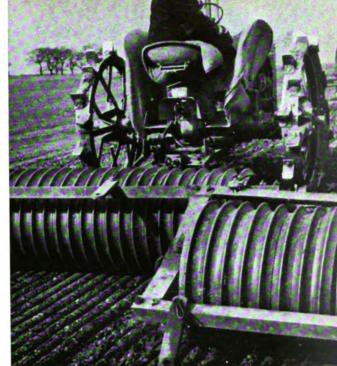
Among the other heavy machines standing about the yard is the bulldozer, a battering ram with astonishing tenacity and strength. Mounted on caterpillar tracks, it thrusts

#### CUT OF THE PLOUGH.

everything before it, slicing through hillocks, clearing the most unmanageable debris, pushing over trees. Another is the gyrotiller, huge, lumbering and slow, almost without equal in taming wild land. It combs the ground with thick steel prongs and stirs it up with a set of wicked-looking blades that revolve like an egg-whisk. This formidable combination can root out the toughest bushes and tear through the most obstinate tangle of roots and stones. This particular one has been working on the clearing of an old forest, its stubborn juggernaut progress combing out tree roots and matted briars at the rate of an acre a day.

The morning is still early and hardly light; the weak spring sun shines dimly in the yellow puddles, but the depot is swiftly emptying. Farmers, farm workers, Committee drivers, land girls, all wrapped in mud-caked mackintoshes, make a loud noise compounded of argument, advice and warning, as they





RAKE OF THE HARROW.

collect their tools and drive them away down the chill echoing streets. As the year advances, this busy traffic of workers will continue, but the type of tool they ask for will change. Spring—like autumn—is a time for preparation, tillage and sowing, and the tools being taken out now are mostly ploughs and cultivators, disc harrows to slice up the furrow, combined seed-drills which sow seed and fertiliser together, rollers to cover and consolidate the seed bed, and the labour-saving potato-planter which is tuned to drop seed at given intervals.

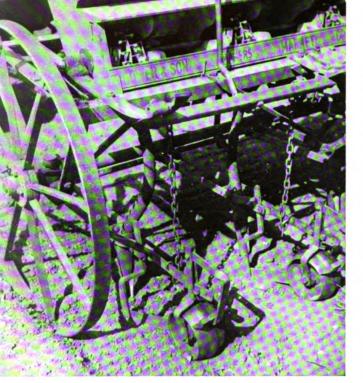
The next demand will be for potatoridgers, and machines with curious spasmodic movements designed for weeding, hoeing, or the transplanting of seedlings. Then the tools for harvesting: mowers, balers, rakes, elevators, for cutting, turning and stacking grass; potato-lifters with revolving forks that throw up the tubers for the pickers to gather. Then the sturdy reapers and binders,

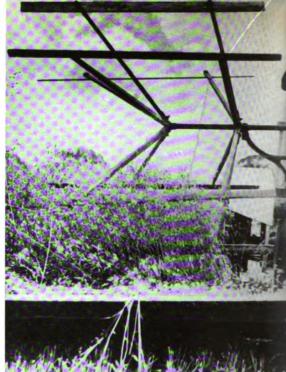
#### PRESS OF THE ROLLER.

veterans of long service but still capable of good work. And finally those giants of the fields, the combine harvesters—complex machines which, manned by one or two men, concentrate all the many processes of grain harvesting—reaping, threshing, drying and bagging—into one swift, continuous movement.

On big fields, where the grain is in good condition, these machines can clear as much as 20 acres a day. They are invaluable in bad weather; by their speed they have saved thousands of tons of threatened wheat from otherwise certain ruin. One Cambridgeshire farmer, racing a storm, brought four of them to his fields as a last hope to save the ripened grain. He drove them through the wheat together in echelon, clearing 36 feet in a single sweep—compared with the five-foot cut of the old horse-drawn binder. When the storm broke, the grain was safe in the barn instead of soaking in the fields.







DRILL OF THE PLANTER.

That is mechanisation—a thing of a hundred complex, specialised tools and gadgets, automatic substitutes for the spade and the sickle, for the hand of the reaper, the hedger and ditcher, the milkmaid, muck-spreader, the turnip-hoer. In terms of gears, cranks, hooks and knives it is all that and more. It is a factory on wheels, a factory that passes over the land, preparing, tending, extracting food. And the tractor is its power unit, pushing, pulling, feeding it, serving its manifold Surrounded by this range of processes. equipment, the tractor is the king-pin of mechanisation, the heart of the modern With these machines it runs and climbs, works the hills, and the fields; ploughs, sows, discs, rolls, reaps, threshes; carries the worker to his job and the gathered harvest to the mill.

Some of these tools were new to the farmer; some were improved versions of those he had been using for years; some had

ARMS OF THE REAPER.

been developed from foreign types; but many were a direct result of his own invention and wartime need. Over two-thirds of the whole mass used in this country were produced in the war factories of Britain.

Farming was once thought to be a slow, back-aching business of hoe and hand-rake, and the farmer a poor benighted fellow, his craft the very antithesis of science and modern industry. But farming is a modern industry, its tempo is tuned to the machine, and the only thing that remains slow about it is the natural growth of the crop.

The job of the farm worker has changed too; he has put off the smock and put on the mechanic's overall, he works now with the tractor rather than the hand-tool; and his job has been the more exacting in skill since it demands not only an understanding of the machine, but still, as ever, an understanding of the land. The farmer and farm worker have had to become the masters of

their new equipment. Their talent for improvisation and invention has always been highly developed; it had to be, for farming has a habit of throwing up problems which must be solved on the instant by intelligence and intuition. But in this war the landworkers not only improved and adapted by their own experience many machines coming into their hands: during the early shortage of tools, they often rigged up the most remarkable substitutes on their own.

So power came to the land, such power as it had never seen before—power to move mountains, drain marshes, to turn bogs into cornfields and cover hills with potatoes; power to fight weather, disease, thorns, rocks, wilderness; power to sow crops without hands and to harvest without loss; power to

win food from the most difficult soils, to spread grass over bracken, to feed beasts where no beast could live before; power which could often be operated by girls and could do the work of armies.

Through it, agriculture found its feet again, stretched out, and tested its new strength. It will never again be just a country cousin; its life is ahead of it, equal to anything the modern world can bring. And, unlike those other symbols of power seen on the battlefield—contraptions bred only for war and death—the farm machine is designed for the living. It can be part of an expanding and highly developed industry, whose work in peace will be as vital to the hungry world as anything it did to help us win the war.



#### New harvests and new men



BYTHE second year of war it was obvious to everyone that the countryside was astir in a big way. Never had the fields looked so well ordered, or the hedges so trim and well cared for. As more and more fields were made ready for planting, this bloom of recovery increased. On every hand there was an air of polish and purpose, a creaking and bustle of mounting activity; it was as if some vast empty mill had reopened its shuttered doors and was slowly returning to its original business.

Yet this was no one-man concern; it was made up of many individual units, not mixed farmers only, but shepherds, stockmen, fruitfarmers, seedsmen, pig-breeders-men who had developed a flair for a particular job and whose talents and experiences were widely varied. The fact that they could now gather as it were under one roof and work to a common programme says much for their From many a farmer—as adaptability. from many another type of craftsman, too war required a complete change of task. He had to accustom himself to unfamiliar materials, struggle with new methods; he could no longer pick and choose his job. Crops that were new and untited to many, and food of all sorts in greater abundance than ever before—this meant upheaval and a new life to thousands of countrymen, particularly the older ones.

Somehow one expects the farmer to turn his hand to anything, but it is no easier for him than for any other man. To switch from pig-keeping to potatoes means sacrifice and the straining of new muscles; from flowers to wheat means a new trade and a new technique. Take the flower-farmers of Devon and Cornwall, for instance. that warm limb of southern England they have always enjoyed a very fortunate climate. Summer stays late there, and spring comes early. Land of sub-tropical palms, of cream, wild strawberries and abundant flowershere were grown the brighter things of life to supply the colder East and Midlands. But you cannot eat flowers. So the flower-farms changed. Mr. B. kept such a farm a few miles out of Helston. Once he grew 30 acres of daffodils and narcissi; he grew them from bulbs which had taken a score of years to refine and develop. In April 1940 he picked his last big crop and packed it off to London. He will tell you what happened after that.

"There was a time when you couldn't look at these fields without seeing daffodils, narcissi, anemones, tulips, flowers right down to the cliff edge, growing all through the summer. Well, there's a different sight to the land now, altogether. Not so much colour, perhaps, but a good deal more spice. I ploughed up my bulbs a couple of years



CROP FACE. Above are the silvered stems of flax plants, pulled by hand and laid out in the sun to dry. Below, a field of seeding carrots, growing where flowers once grew, their useful heads supplanting blooms of aster and chrysanthemum.

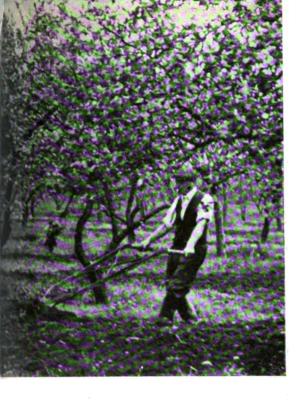




INTERCROPPING. Ploughing among fruit trees is a ticklish job, though good economy in war time. Fertilised by years of fallen fruit and leaves, the soil is rich and a heavy crop will grow here.

back. It wasn't a job I liked doing, I can tell Now I'm growing wheat, potatoes, carrots and onions. Some of my bulbs are still rotting in the ditch, others have been steamed and fed to the pigs. But I'm not wasting any sleep on them, that's all done with. We flower-growers are still allowed to keep on a small percentage, but I thought I'd make a clean sweep of it. This is good sheltered land, light and easy to work. Down by the sea I'm growing two crops a year, early potatoes followed by carrots. We've had help from the Committee with ploughing and lifting, but weeding's the very devil; the back of my neck is scorched to a cinder. and so is the missus's. Still we can't grumble; we got nearly a hundred sacks of grain last year, 50 tons of potatoes, and 20 of carrots. Land which grew good daffs can grow good vegetables, and I reckon it'll grow just as good daffs again if we want it to."

Flower-farmers all over the country were making a similar effort. And they were giving up a good deal. Acres of rose trees ripped up by the plough made room for wheat and barley; lilies and orchids cast out of the hot-houses were succeeded by more practical, less exotic plants - tomatoes, lettuce, mustard and cress. Those rainbowcoloured nursery fields, once a riot of carnations, lupins, roses and chrysanthemums, the despair and admiration of amateur gardeners, assumed an austere sobriety, spread with such matter-of-fact necessities as grass seed, potatoes, cabbage and parsnips. Ploughing in bulbs, rooting up rose trees and fields of valuable shrubs and plants-all this was no easy thing for the nurseryman to do. He gained nothing by it; it was often something of a real tragedy to him. He just knew it had to be done. But, with his acres of frames and glasshouses, and his unique experience



of plant-rearing, he made his own valuable contribution, and often provided backyard gardeners with quantities of seeds and millions of young vegetable plants to bring on for their own domestic use.

With the fruit farms it was the same; technique and equipment were similarly adapted. In the orchards of Kent, Cambridge, and the West of England new crops sprang up between the severely regimented trees; no space was left idle. In some parts there were orchards, planted half a century ago, which had seen their best days. Crumbling old apple trees in advanced stages of decay, their warped trunks full of wood-lice and loaded with mistletoe and fungus, cluttered up first-class land. Such trees had to go, and many acres were cleared. Tractors pulled the trees down, and gyrotillers grubbed up their roots. Huge bonfires were built, filling the air with the aromatic smoke of burning apple and cherry wood, and much good potash was added to soil already enriched by years of rotting fruit and leaves. Fields such as these produced bumper harvests.

Younger, healthier fruit-trees were spared, but the land between them was squeezed to the last drop of goodness. This sort of thing is called intercropping, and here is a Cambridgeshire man's account of it:

"I've 10 acres of apple, 10 of plum, and a dozen of cherry. The trees grow anything from 10 to 20 foot apart. For the past three years I've run a plough between 'em—rather a ticklish job till you get the hang of it. A tractor goes down the avenues and a horse-plough does the cross-work. In the old days those trees just grew, and there was always a lot of good grass going begging. Perhaps I'd run a flock of geese on it, or graze a few goats; I might even feed a pig or two on the windfalls, but I never tried intercropping

TRACTOR UNDER GLASS. Preparing ground for tomatoes in a three-quarter-acre greenhouse in the market-gardening country near Evesham.



before. Now I'm growing potatoes where those geese used to run; I lifted 50 tons last year and I reckon there's half as much again waiting to be lifted this. Besides which, I've fattened a score of heifers in the orchards and my fruit crop's as good as ever. I suppose it just goes to show the land we used to waste."

The plough brought new crops and a new outlook to another specialised type of farm—the stock-fattening grasslands of the South and Midlands. Beef is fattened on grass; and English grass, when it is good, can hardly be bettered for this purpose. Neither New Zealand nor South America at their best could ever show anything to compare with the deep lush pastures of Leicestershire, for example, or the Romney Marshes—at least, as they existed before the war. But such permanent grass and the beef it produces were expensive luxuries to a nation besieged; it could save more shipping by growing wheat and potatoes.

DOUBLE HARVEST. In a West-country orchard girls gather plums, while rows of inter-cropped potatoes flourish beneath the fruit trees.



The wartime story of the "Five Langtons" near Market Harborough is typical of the way in which many of our best grasslands were conscripted. What we saw there is perhaps the most significant and complete change-over to be experienced by any The parishes of Langton were unique. Their five church towers overlooked some of the best pastures in the world. Years of expert management had produced on those gentle hills grass of such astonishing richness that it was possible to fatten as many as two bullocks to the acre in a good summer. The soil was deep and the colour of milkchocolate, the sward was like honey to the feeding cattle. It had been achieved by generations of careful grazing, weeding and dunging. Nobody dreamed of ploughing it: they would have thought it madness. As a local grazier put it:

"When you came to the Langtons you were in the Land of Goshen. Fields all covered with clovers, and ryegrass as rich as cake. We weren't farmers in this part of the world: we were graziers, and grass-management was our life. We could tell from the look of a field what would thrive on it—this for bullocks, that for heifers, the other for young calves-even the kids and the women could tell you. We used to buy in lean cattle from Ireland and Wales, strong Hereford beef bullocks and so on; turn 'em out to grass round about May, and just sit on our behinds and watch 'em grow. Fields were grazed down through June and July, then rested while the cattle went east to winter in yards. Aye, stock-fattening was a gentleman's life."

Then the time came when a much weightier yield was required from this land, far more than it would produce in meat. "It had taken some of us nigh on 50 years to get the grass in that condition. We thought the world had gone mad when they asked us to plough. We pretty near wept when it came to it."

But they ploughed. The fat-stock left the



land, and field after field came up, some for cereals, for potatoes, for sugar-beet. It was a hard new life. Travelling light with summer grass and cattle had been the graziers' existence: it left them with little over for farming proper; no arable experience, no equipment, little skill, few buildings-nothing but the land. Yet they found what was lacking. Skilled men from the eastern arable districts moved in to reacquaint them with the art of ploughing. They bought machinery and knocked up tools of their own. One of the first potato-drills to be seen in that district was rigged up by a local blacksmith. Soon, only a few of those fields carried the beef cattle of old; the rest bore a heavier harvest.

Old-time graziers saw these pastures go with some misgivings. In fact there was one occasion in the Romney Marshes when this feeling went so deep that an old man rose up and laid the "curse of the marshmen" upon a team of land girls who were ploughing the sacred turf. "Those pastures took 50 years to mature," he said; "they've gone and I shan't live to see them come back." He need not have worried. Scientific re-seeding can return those pastures to their former excellence, not in 50 years, but in as many months.

Cereals and potatoes were the main crops of war. If bread is the staff of life, the potato is its second prop; it was vital to us in war time, for it gives bulk, keeps well, and goes with anything. In 1917 it was only because we had a good stock of potatoes in hand that we survived the critical U-boat peril.

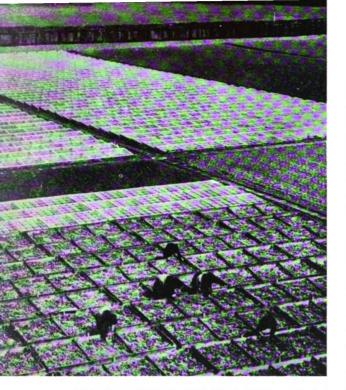
Nearly every farmer had to grow a quota of potatoes, and many new growers did not enjoy it. The potato is laborious, time-consuming, sensitive to disease, and hard to handle without special equipment. Nevertheless, each man did his share, and many lightened the task with various devices of their own. In the early days, when special equipment was difficult to come by, a Cots-



POTATO CLAMP. Warm under their blankets of straw and earth, they'll last the winter through.

wold sheep-farmer was asked by the local Committee to plant ten acres. He surveyed the heavy field with distaste; the prospect of sowing the potatoes by hand, eight inches apart, arduously, row by row, gave him no pleasure at all. The way in which he solved his problem has become one of the brighter legends of the village.

"I just happened to be going by his place one morning", says a neighbour, "when I heard a noise like a gurt clock. I didn't know where it came from till I looked over the wall. Then I seen old Jesse. He'd got a three-furrow plough he was ridin' on and a tin bath full of spuds in his arms. He'd raked up an old chimney-pot from somewhere and got it wedged between his knees. There was some sort of gadget stuck on the wheel somewhere which rang a bell every time it turned round, and each time this



FRENCH STYLE CULTIVATION. Forcing lettuce under frames of glass breaks the monotony of winter cabbage by providing early salads.

bell rang old Jesse dropped a tater down the chimney. 'Jesse,' I said, 'that's as neat a contraption as I've seen anywhere'." Jesse was ploughing three furrows and planting at the same time, dropping the potato in the third furrow as he went along and so spacing out the rows. This was his own solution, thought up in his own bed. Many others conceived their own variations, no less ingenious.

Sugar-beet is another crop which increased and which many farmers were tackling for the first time. Before the war, the industry was subsidised, and many people were puzzled by this: sugar comes cheap enough from abroad, they said, why bother to grow it here? It is lucky for us that we did. The experience then gained by the growers was largely responsible for the great harvests gathered in war time. You could see the

plants in many parts—scraggy tubers, looking no better nor any sweeter than common cattle-food. You saw it piled in railway wagons, or heaped by the roadside waiting for transport to the factories. You may not have been impressed by the sight of it, but that was your sugar ration. Very few ships were needed for sugar. Year after year the entire domestic ration of the country came from these muddy-coloured roots.

Yet another new name to the farmers is flax. Wherever the blue flowers grow they light up old fields like patches of summer sky or stretches of south-sea water. Cultivated hardly at all in Britain between the wars, flax became a crop of the first importance. It was utilised in the making of canvas, tents, maps, camouflage, aircraft fabric and parachute-harness. In Kent, Sussex and East Anglia, as well as other favourable districts, the problems of flax-growing and the moods of the plant became new topics for argument and dogma among the farmers. New machinery was evolved to help with the lifting. Many who thought flax altogether too temperamental to grow in peace time tackled and mastered it.

But among all these extraordinary demands for new crops, for bigger harvests, for better farming and improved methods of cultivation, the problems which arose created their own opportunities. They brought an excitement back to the land which infected everyone, even the lost men who had long since given up the struggle. These suddenly became aware of the intense activity of their neighbours. They saw that they were needed, that there was a point to farming after all; and some old spirit of competition or pride awoke in them again. One such old man, who lived alone on a poor 50-acre farm in the Peak district, tells his own story. In 1940 he was classed as a "C" farmer, which meant he was not getting the best out of his land and was therefore in danger of losing it.

"In 1914 this was as dainty a farm as you

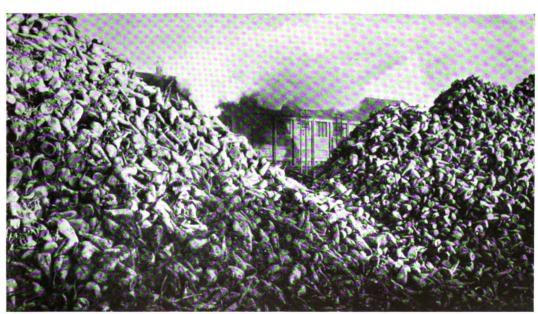
could wish to see. I had three of my sons working with me then. We kept sheep and cattle and grew some tidy oats and barley. Then the boys went off to the war and didn't come back. The land got the master of me after that. I fell into debt, sold my cattle, and lived on rabbits and mushrooms and a bit of cabbage I worked myself. After a time even that got too much. I asked the moneylenders to help me with a tractor, but they didn't fancy it. The soil wore thin, blowing off the rocks, and bracken took a hold on everything.

"When the District Committee-man came in 1940 I was at the end of my rope. He said the land couldn't lie idle and he'd have to take over. I was mad. I almost fetched the gun to him. But we went for a walk round instead. My neighbour was ploughing down by the stone quarry and I said: 'Where did he get that tractor from?' The Committee-man said: 'From us'. I said: 'You just lend one to me—I'll show him a

thing or two'. Well, I got one. I scrubbed up my old plough and cleared 30 acres of bracken that year—alone. I planted wheat, potatoes, and rye-alone. On the strength of what I'd done, the Committee advanced me enough money to buy my own tractor. I wheedled my widowed sister to come and live with me, and we got in a land girl from the village. Then we branched out. The Committee kept an eye on us and hired us more labour. Next year I cleared another ten acres of bracken. I gave it a good dose of fertiliser and planted a nurse crop which I fed off on young tegs (sheep). the land's clear; I'm growing rotations of wheat, potatoes, beet and peas. I've advanced my status as a farmer and I don't hear anybody saying 'poor old George' any more. I'm as young as any of 'em. I feel like a boy."

So profits the land by proper employment and change, giving us new crops, new ways, new farms—but also new men.

SUGAR RATION. Piled like coal in a factory yard, the raw beet awaits refining. The entire domestic sugar ration of the nation comes from this home-grown root. Cattle food and molasses are also by-products of it.



Digitized by Google

### Reclaiming the bad lands



GOOD BRITISH farmland is a shrinking commodity. Consumed and lacerated by spreading cities and arterial roads, it has been shrinking for years. There was never so little of it as when the war began. And never before did we need so much.

The first thing war did was to seize a great deal more. Modern arms are insatiable in the matter of land; new weapons and new defences need land and more land, and generally of the best quality. Fighter and bomber aerodromes, requiring thousands of flat dry fields, obliterated many farms. This, of course, was unavoidable, but it did not end there. In wide rings round the cities, along the invasion coastlines, at strategic points everywhere, land was used up in essential preparations for defence and attack, in the siting of batteries, searchlights, camps, radiolocation, store-dumps, and battlepractice grounds. Since war began, several hundred thousand acres have been completely lost to food production in this way. Nor was that all; thousands upon thousands of good open meadows were mutilated by widespread anti-aircraft and anti-tank devices. Ditches were dug through wheat and broke through the underground drainage systems of many farms; poles, wires, logs, brick-heaps, concrete blocks and old cars were scattered over the fields in prodigal confusion. Necessary as these precautions

were, they were at the same time a severe hindrance to cultivation.

If the farmer had thought fit to confine his attentions to the land that remained to him, ploughing up only so much as was contained by his fences, he would have reached a point of saturation when there were no fields left to plough. In that case we should have gone hungry, for the extent of British farmland proper, no matter how intensively cultivated, is inadequate to supply us with all we need.

But the farmer was not so content. He knew he must extend his territories and replace the lost lands by bringing back into use the inferior pastures which had fallen out of cultivation since the last war, and by reclaiming unwanted wastes of bog, fen and moorland which hitherto had resisted or did not repay cultivation. Such deserts lay scattered all around him. Many of these had never before been cultivated, because old-time methods could do nothing with them. They were the bad lands of Britain, and the farmer had long had his eye on them. Now the coming of the machine brought them within his grasp.

The reclamation of these idle acres was perhaps the most dramatic aspect of British wartime farming. Never before had this country seen such operations carried out on such a gigantic scale. It has been an achievement in tune with the scope of our



LAND OUT OF .HAND. (1) Once a country lane surrounded by farmland—now a building estate. (2) Fields stifled by stagnant water through lack of proper drainage. (3) Dormant pasture, coarse with old grass; hill slopes covered with useless bracken.

time, conceived with imagination and carried out with the full-blooded use of the machine.

"After the fields, the swamps and commons, then the hillsides, then the mountaintops." That was the slogan. Everything outside the fields was a sort of desert warfare. And this campaign, waged with heavy modern equipment, may in its modest way be compared with the achievements of the North African army. In nine months that army subdued a coastline which once resisted the armies of Muhammad for a hundred years. Here in Britain the agricultural reclamation squads, assailing at times land so wild it had never known the plough, forced it to bear the first harvests in the history of man. It is here we saw the countryside's most remarkable transformation, and the real power of modern farmingin the harvesting of the mountains and marshes where no man had ever before seen a food crop grow.

It was to these extreme achievements, as well as to the humbler ones wrought upon common land and old pasture, that we owed so much of our security in terms of food. Potatoes flowering on the hills of Wales, oats and barley on Hackney Marshes, wheat from bogs, from scrubland, and once flooded valleys-these were but a few signs of the power of wartime farming. We saw all this; but, wherever there was open ground, we could see harvests taken; from ground long hallowed by tradition and customgolf courses, race tracks, cricket pitches, bowling greens. These, covered with onions, cabbages, rye, potatoes, were not so much reclaimed as surrendered willingly to a necessary cause.

Britain, like the rest of Europe, was once a mighty forest roaming with wild pig, wolves, and deer. Our forefathers hunted these animals with bow and spear. Later they settled down, kept flocks, and began a primitive agriculture. It was they who cleared the forests and created pastures, for pastures are not natural to Europe. But the seeds of the forests remain. If the hand of man were removed altogether from the land, and his livestock wiped out, Britain and Europe would revert to their original forest state. The briar would run first through the rank, tough grass, bushes spring up and spread and tangle; for a time there would be dense jungle, then the trees would come.

At the outbreak of war it was possible, in certain districts, to see fields and patches of waste ground where this sinister process was already far advanced. One such place, a choked and notorious wilderness lying only five miles out of the city, was tackled by the Cambridge Committee in 1941. There were over a hundred acres of it, and it was very far gone. Neglected for 50 years, it was so overgrown with knotted vegetation that the place had almost the look of an African jungle. Thorn trees twisted their black crazy branches to a height of 12 feet. The sun filtered through but dimly. Foxes, rabbits, and badgers lived secluded lives there in continual twilight.

"This land wasn't worth more than twopence an acre," said a local man; "you couldn't shoot through it, you couldn't move in it, in fact nobody would go near the place. It was lost land all right."

To reclaim such a waste was a major operation, calling for plenty of labour and the best machines. Most of the machines were provided by our allies, and General Wavell supplied most of the labour. Late in 1941 Italian prisoners of war were set digging drains and cutting back the bushtops. They worked well and seemed to enjoy it. One said he preferred it to being chased all over Libya, anyway. As the jungle receded before their axes, huge bonfires were built, blazing by day and extinguished by night.

The Italians were followed up by gyrotillers and bulldozers, tearing out the long tap-roots and dragging up the stumps. These, too, were gathered and added to the fires. The action of the gyrotillers threw the heavy clay into huge clotted lumps as if the place had been raked by intense gunfire. All this had to be worked and broken down. Land girls arrived with caterpillar tractors, rollers, disc-harrows and deep-furrow ploughs. They went over the ground again and again, battering and slicing those heavy clods, till they had reduced them to some semblance of a seed bed. The job was a wearing one; it took two hard winters to clear the land completely. But the result was a clean dry field, wide as an aerodrome, capable of producing hundreds of tons of wheat and potatoes—food for humans, not food for rabbits.

This job is typical. Similar large-scale efforts in all parts of the island have made farming history. Farmers will quote them for years to come and use them as a measure for the possible and the impossible. They will talk often of the Battles of Dolfor, Long Mountain, Stonyhurst, Hollow Moor, Swaffham, Feltwell and Burwell. For these are names which cover the country, from Cumberland to Devon, from the Welsh hills to the eastern Fenlands.

Take Feltwell, Swaffham and Burwell, for instance. They lie to the south of the Wash; they are part of the fertile Fen Country. Once they were names of desolation. They now speak for some of the most highly productive areas in Britain. Before the war, you would have to go far before you beheld a sight more drear than those wild marshes. Thousands of acres of low flat land smelling of rotten weeds and the sea. Nothing to be heard but the rattling of wind among the nine-foot reeds, the screaming of wild birds, and the slow sucking of the flood waters. A few pitiful signs of man's earlier attempts at cultivation merely added to the all-pervading sense of wilderness and decay. Broken dykes foundered among the morass, choked up and glutted with reeds and stagnant water. Tattered windmills, like huge dead crows, drooped motionless above the rushes. And here and there the black timbers of a deserted farmstead writhed in fantastic ruin as the spongy bog sucked at its foundations.

There had once been a hard-living community here, working the marsh as best they could. They had been driven out at last by failure and flood. High tides broke in and fouled much of the land. Reed, scrub and willow-herb took possession, and wild birds made a sanctuary of the place. Over the yellow swamp flew bittern, harriers, grebe, mallard, snipe, herons, redshank, and peregrine falcons. Coots and moorhens dived among the weeds. The marsh's only use to mankind lay in the tall rushes occasionally gathered for thatching purposes. It was a dismal enough prospect for reclamation; the area was the less fortunate heart of a particularly well-farmed district, and good black soil lay under all that waste. In 1941, however, in the face of great difficulty, 1,500 acres of Feltwell Fen were successfully reclaimed by the Norfolk W.A.E.C., and first-class harvests were subsequently taken from it.

It was about the same time that the Cambridgeshire Committee approached Swaffham and Burwell. Their task was, if anything, even more forbidding. They knew it would call for everything they had got. Before they could bring their machines to the land, concrete roads had to be built—pushed out across the bog like duckboards. They had to be built on very solid foundations, and the remains of many a bombed East Anglian cottage went into these.

The roads were laid out in large squares, isolating a hundred-acre block at a time. From these the machines worked inwards, beginning with the drains. For every hundred acres of land, five miles of drains had to be cut. The existing system, a complex net of high- and low-level dykes, had to be cleaned, strengthened and repaired. This, before any other work could be done. Slowly the land began to dry out. The gangs waited with the necessary patience.

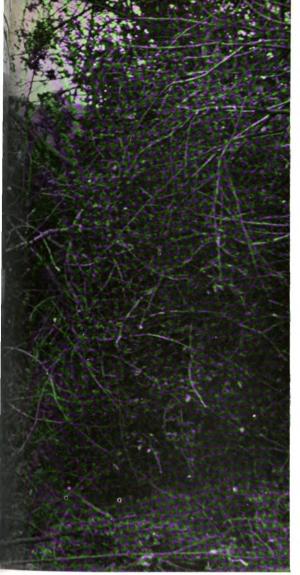


If the tractors had started work too soon they would have been hopelessly bogged, or perhaps swallowed up altogether. But at last the place was firm enough and the onslaught began. A large force of workers, among them 60 land girls, set about the reeds with knives, cleared them and burned them.

Then came the caterpillar tractors drawing

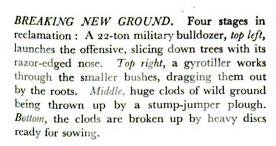
the heavy assault machines—Canadian prairie-busters, disc-harrows, and the formidable Australian five-furrow stump-jumpers. The blades of the stump-jumper are designed to spring clear of submerged obstacles, such as rocks and logs, instead of breaking off as the blade of a normal plough will do. It proved, on this particular job, a very useful tool to have. For it discovered quite soon













that parts of the Fen were packed with submerged obstacles, huge trunks of petrified bog-oak, unyielding and hard as iron, lying around like outsized coffins in a churchyard. Buried only a few inches deep, preserved by peat and salty water, they were relics of a primitive forest and had lain there for thousands of years. No one had ever tried to shift them before. Here and there some old farmer had stumbled upon one with his plough, had hacked at it ineffectually with an axe, but that was all. Now they were coming up; their graves were needed; but clearing them was by no means an easy task. Said the gang-foreman in charge of the job:

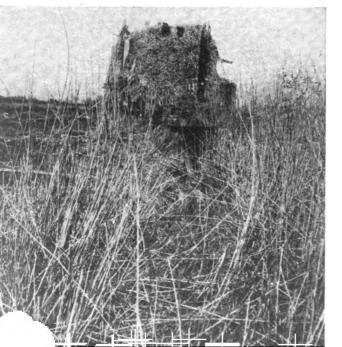
"They nearly broke our hearts at first." Some were 7 feet thick and as much as 100 feet long, and they were lying 50 and 60 to the acre. We couldn't plough an inch till they were shifted. We decided the only thing to do was to dig round them and then blow them up with dynamite. A hundred land girls—Lancashire lasses mostly—set to with spades. They worked like Trojans, but they

had to dig deep and the job took months. After they'd laid them all bare the Royal Engineers came, drilled holes in the trunks, set charges, and blasted 'em up into short lengths. These the girls towed out with tractors and piled along the roadside."

There they remained, torn from their ancient beds, vast black hulks crumbling with dust and age. They looked like those charred wrecks of German aircraft which were dumped in the Kentish fields after the Battle of Britain. They were in fact a symbol. For, ever since man first cultivated the land, they had strangled this part of the Fen. Now the fine black soil was rid of them at last, and the highest yields of wheat, potatoes and sugar-beet could be taken from it every year.

That is only a part of the marshland's story. But let us turn now to the hills, where an altogether different problem was tackled. The mountains of Wales, the moors of Devon and Cornwall, the Pennines, and the hills of the Lake District cover nearly a third of England and Wales. In the past

BREAD FROM THE WILDERNESS. Feltwell Fen, was a dead place of broken dykes, sour water, and yellow reeds. Now the dykes have been cleared, the reeds replaced by acres of lusty wheat.







DIGGING UP THE PAST. Oak trunks, five thousand years old, were found buried in Feltwell Fen. They were dug out and dynamited to free the land for the plough.

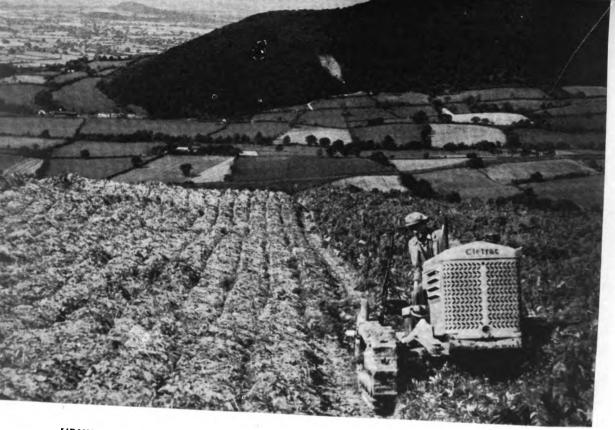
they had provided little more than grazing for sheep and the hardier breeds of cattle. The difficulties of ploughing this high land were, of course, great, for much of it has no more than a very thin coating of soil over the rock. But on some of the rounded hills of Cumberland and Wales there is a body of soil that goes deep and carries an abundance of bracken. And there is an old tag which says, "Where bracken will grow, potatoes will grow".

The Montgomeryshire W.A.E.C. had this in mind when they reviewed the bleak heights of Long Mountain and Dolfor. Nothing lived up there but a few sheep and a few wild ponies. There was a bit of dead grass and a lot of scrub. But the Committee thought that, given the proper equipment, they could put crops on those hills; there was no precedent for such a venture, but the time

was spring 1940—a good time to ignore precedent. So they made their plans and the "Montgomeryshire Experiment" was begun. It was the first large-scale reclamation of the war.

The Committee foreman-in-charge, a tough, jaunty little Welshman with a jaw like a spade, had the job of organising the actual operations. For three years he spent the better part of his daylight hours upon those mountains. He said:

"When first we started, there was no model for what we intended to do. Whether the hills could feed anything save hawks and wild ponies was something most people doubted. But those were Dunkirk days, so we thought we'd try it out. We started in on the side of Buttington Hill—part of Long Mountain. Bracken grew ten feet high, higher than the tractors, and thorn bushes



UPHILL WORK. The first stage of the Montgomeryshire Experiment. A prairie-buster climbs Long Mountain, turning up great furrows matted with bracken roots. In the distance stands one of the "Gates of Wales".

had to be pulled out by steel hawsers. The hill was steep; we ploughed it, disced it, and planted potatoes right away. That was our first mistake—we should have taken a pioneer crop off first, but we wanted potatoes and we were too impatient."

There was little labour and fewer machines that year. The potatoes were planted and lifted by schoolboys and village women. Next year the bracken sprang up as thick as ever. But this time the Committee knew how to deal with it. New machines had arrived, prairie-busters and heavy discs. With these they tackled the bracken in time and ploughed deep.

In 1941 they took in more of Long Mountain, ploughing 400 acres right along the

peak, farming now well above the clouds. Here they made sure of the bracken. The sod was turned over flat and given several discings. They took tests for manurial deficiency, and gave the land a good dusting with lime and basic-slag. Next, instead of immediately sowing potatoes, they sowed a crop of rape and fed sheep off it. The sharp hooves of the feeding sheep, together with their droppings, helped further to build up the soil's fertility. By the following spring Long Mountain was ready for potatoes.

From Long Mountain the Committee moved on to Dolfor, high land on the edge of Radnorshire, and took on a thousand acres there. After that, they extended their hill territory by nearly a thousand acres a year. They were farming on a scale unknown to the more confined farms of the lowlands. They were cropping 500-acre blocks of land at a time. There are "fields" such as these, running across Dolfor, where the ploughs were cutting single furrows 1½ miles long. They got the measure of the job. They covered the mountains with crops, and regrassed the highest, most desolate peaks, with all the confidence of a farmer working his favourite meadow. And from the potato-clamps they set up—storage mounds of earth and straw which stand on the hills throughout the winter—sufficient potatoes were taken to feed the whole of Manchester.

The Montgomeryshire Experiment proved without doubt the possibilities of those onceneglected hills. It proved that, with the proper use of machinery and fertilisers, good crops can be grown well above the traditional contour limit—to heights of a thousand feet and over. It proved that even higher levels can be resown with good grass that will thrive and maintain stock on land which was hitherto quite unproductive. Such achievements, apart from their extreme usefulness in war time, are likely to have a profound effect on the future of hill-farming.

The efforts of those pioneers were echoed in many other parts of Britain too. Ten thousand acres of rough Pennine moorland were ploughed for kale and oats, and fodder for cattle. In the North Riding of Yorkshire, ploughs and cultivators worked in cloud and snow while the valleys beneath them were bathed in sunshine. Near Ullswater, in Cumberland, tractors and threshing tackle were edged up the 1 in 4 gradient of Hallin Fell to harvest the highland crops and confound the neighbourhood, which never believed they could get there. On the chalky switchback Sussex Downs large areas, cleared of gorse and bracken, carried the first crops since the days of the Saxons. In Wiltshire, 500 acres of Kings Heath Common, whose grazing rights have been handed down from family to family

since the days of King Athelstan, were ploughed up after a council of war held by the Commoners in the ancient Court House of Malmesbury. At Northwood, Slindon, hundreds of acres of bramble, willow-herb and scrub, riddled with rabbits and foxes, were cleared up and the vermin slaughtered by gas. John Bunyan's "Slough of Despond"—a low, sterile swamp lying between Ampthill and Bedford—was drained and cleared and 2,000 acres of it sown with wheat and potatoes.

These are *new* lands; and they are only a fraction of what was reclaimed in the war years. They replaced the building sites, the airfields, the camps, the necessary wastage of war. The food they gave us was our absolute gain. That food was here, it could not be torpedoed, and it cost no lives. What it did cost was imagination, sweat, skill, and the long, back-breaking, dawn-to-dusk, all-weather endurance of the farm worker—man and girl.

THE HILLTOP YIELDS a 2,500-ton harvest of potatoes, fruits of the first large-scale reclamation of the war, which turned Long Mountain from a place of bracken to productive farmland.



Responsibility for most of the large-scale reclamation fell, of course, on the County Committees, for they were a national organisation with special facilities for such work. They could command equipment, capital, and expert knowledge outside the scope of the private farmer. But much, all the same, was achiezed by him too, and the more remarkable it was because of his limitations. Here is a final story, told by a Hampshire man of what he did with 1,000 acres of scrub in that county:

"When I took on this land," he said, "I reckoned it the most worthless stuff on God's earth. It was Downs-type land, steep and rough, and covered with bush as black as a monkey. One of our heifers went and died in it and we didn't find her for three days. The last chap here used to live on black-

berries and rabbits: I don't know how he did it. When I arrived, they said to me, 'That land won't grow anything, mister. Why, it's so poor you got to put straw out in the winter to keep even the rabbits alive'. I started anyway. I got some stiff tackle together and we tore out the bushes and burnt them. I set my men killing rabbits at a tanner a time and they cleared over 2,000. Then we ploughed it and gave it a good dose of lime. I re-seeded a hundred acres for dairy cattle, and put sheep on to the rest. Next year I planted wheat. Since then we've had oats, barley, rye, sugar-beet, and spuds off it. It's pulling its weight now, but it was mighty poor stuff to begin with. Why, before the war I wouldn't have looked at it-not even at no rent. Only Hitler and the War Ag. drove me to it."

THREE-MILES HARVEST. In 1939 Hollow Moor was derelict land, feeding a few cattle and a few wild ponies. In 1943 it looked like this, a vista of golden stooks, bearing 350 tons of oats.



# The countryman's myriad foes



THE SOIL, by its nature, is not always It can bring forth in equal benevolent. abundance both good and evil; it can produce a good crop and at the same time the means to destroy it. Earth-born pests and plagues are the enemies within the gates microscopic but formidable saboteurs whose existence depends wholly upon the damage they can do. They are a potential menace in the best soil and the farmer can never let up in his struggle against them. His crops and his cattle are in continual danger from them. They attack from all quarters: from the air, the ground, and under the ground. They take forms both visible and invisible, from the rat and the woodpigeon to the blight-fly and disease-producing virus. war time, every resource of farmer and scientist had to be mobilised against them.

Certain wild birds, for instance, are a serious threat both to the newly sown seed and to the harvest crop. They are elusive, and well equipped by Nature for sudden attack and quick get-away. Woodpigeons, particularly, are insatiable marauders and very cunning. When planning a raid they carry out very careful reconnaissance beforehand, and are at all times extremely sensitive to danger. But when they get among the crops they eat with astonishing rapidity and do great damage. The gizzard of one dead bird, shot down in a Home Counties field.

was found to contain over a thousand corn seeds, black oats and buckwheat seeds. And he was no exceptional glutton.

To counteract the ravage of woodpigeons, large-scale campaigns were organised against them. Army observers and members of the Royal Observer Corps, switching their attentions from enemy aircraft, reported their movements, and huge flocks were ambushed and shot up from such information received.

A notable expedition was organised one year in Oxfordshire. Large flocks had been reported roosting in a certain wood. Farmers, Home Guards, soldiers, anyone who could fire a gun, went out and lay in wait for them. Dead birds and wooden dummies were used as decoys. When the birds arrived, weaving in the air, the sight of the decoys lulled their suspicions. They came in to roost with absolute faith, the guns opened up, and there was terrific slaughter.

House-sparrows are capable of causing great havoc among standing wheat. When the corn is ripe, they move out from the towns in numbers and, joining the local sparrows, they will come down in a scattered cloud, spread out, and in a short time leave thousands of empty wheat-ears transparent against the sun. At times the tough, belligerent house-sparrow is a menace to that useful bird the house-martin, which feeds upon insects. Many house-martins' nests are com-

mandeered by thieving sparrows in spring and summer. Shotguns and airguns had little effect on the sparrow. It fell largely to the shouts and rattles of schoolboys to keep him at bay. This the boys did with enthusiasm, spending long hoarse hours in the fields at harvest time.

Then there are rabbits. Their combined operations throughout the year costs the country many millions of pounds. The flesh value of the wild rabbit in no way compensates for the food he eats. He has, therefore, been the object of a sustained and well-organised punitive expedition, embracing methods of extermination unknown to his ancestors. In the early part of the war he was in sole possession of much valuable land. Before long he was being trapped and gassed in his millions.

The chemical gassing of rabbits is comparatively a new thing; at least, it had never been practised on such a scale in this country before. It is invaluable for attacking

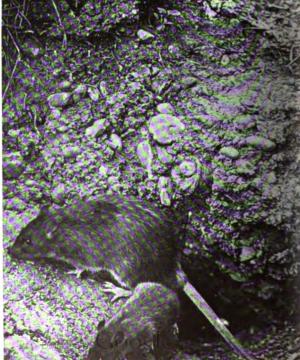
rabbits underground. It is ruthless, quick, and effective. One farmer, tired of taking pot-shots at a warren multiplying in one of his fields, appealed to the local Committee for help.

"They sent me along a tin of powder," he said, "with instructions. It was queer-looking stuff; I didn't see what good it would do against all those rabbits. Thousands of them there were, they'd eaten me right down to the doorstep. Well, I gave it a trial. I took my boy up to the bank and we fixed the gas and stopped up all the holes. I don't know what happened, but we never saw them again."

The rural rat, who spends his summer in the hedgerows, banks and ditches, and moves when the time is ripe into the stocked barns and wheat-stacks, is another pest capable of enormous destruction. One pair of rats can produce 880 surviving offspring a year, and each will eat 10s. worth of food. Such a menace are they that the Government has had to enforce, by special orders, the taking

ROGUES' GALLERY. The squirrel, rat, woodpigeon and rabbit attack from trees and sky and from under the ground. They will eat any crop from the field or the barn. They cost the farmer millions of pounds a year.





of precautions against them. At threshing time all ricks must be fenced around with wire to prevent their escaping. There may be a hundred or more rats living in one rick. When the corn is threshed, they are forced into the open and can then be polished off with sticks and dogs.

The Pest Control Staffs of the County Committees trained special operatives whose full-time job it was to fight rats all the year round. The familiar rat-catcher, with his stick, gaiters, struggling bag of ferrets, and quick wiry terrier, was still an important public servant, but he had now been joined in his work by a figure much less familiar, though equally dangerous to rats—the trained land girl. The isolated, intermittent attack upon the rat is usually a waste of time; it merely drives him away to fresh ground. The assault must be a planned, co-ordinated drive covering a wide area. Many such operations were organised by the County Committees, through their Pests Officers,

and entire colonies of rats, numbering many thousands, were wiped out in this way.

The land girl rat-catcher (and there were many of them) must be one of the most intriguing personalities the Land Army produced. She took to her job with a determination and lack of fastidiousness which must have astonished many of us with old-fashioned ideas as to woman's antipathy to rodents. Some, working entirely on their own, established remarkable personal records. In two days, a 19-year-old ex-dress-designer from Leicester gathered 327 carcases from a Yorkshire granary: and 300 rats can eat three tons of wheat a year.

Here is a story, told by an East Anglian farmer, which illustrates something of the impact of this new type of rat-catcher on agricultural life:

"A girl came into my yard one morning and said to me, 'You've got rats here, haven't you, mister?' and I said, 'Well, maybe half a dozen, but they won't hurt you,









RATS BREED, LIKE DISEASES, in the midst of what they feed upon. From the rick, above, a trained land girl hunts them out with ferrets. Below, the result of one day's offensive in a Hereford barn.

Digitized by OOS

missy", and she said, 'It's not me I'm worrying about'. She took a look at the barn and the drains and said, 'You've got more than half a dozen, mister, but leave 'em to me, I'll fix 'em '. Then she opened a sack and started bringing out bait and poison. I said, 'What d'you think you're up to?' and she said, 'Don't you worry, mister. I'm the rat-catcher. The Committee sent me down'. But I did worry. I flew around to my man and I said, 'Lock up all the stock, Alf, there's a female rat-catcher here and she'll slaughter the lot!' He was as frightened as I was; but we needn't have bothered, the girl knew her job all right. Later that week she came to me and said, 'Take a look at the barn, mister'. I did, and there were 60 dead rats laid out in the prettiest pattern vou ever saw. And I never knew we'd got that many in the whole village."

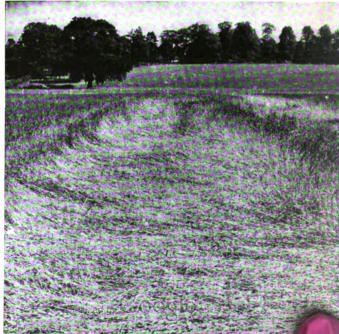
The grey squirrel, charming as he may appear to the eye, is but another of the nation's food robbers and must be ruthlessly destroyed. Since establishing himself in this

country he has done immense damage to crops of many kinds, and to the farmer he is nothing more than a tree-rat and a dangerous and destructive animal.

Other less obvious pests, diseases and blight, attacking both plant and animal, are not so easy to fight. They are intangible and work invisibly. Wireworm and leatherjackets, eating away the roots and rotting potatoes; the whitehead fungus which rots the cornstalk; the bulb-fly maggot which breeds in the young shoot and withers it; frit-fly and turnip-fly whose parasitical presence can turn a lusty crop into a heap of infected rubbish; these are only a few of the plagues which the land, like the human body, can contract without warning. Then there are those deadly, extremely contagious diseases to which even the healthiest of cattle are subject; diseases which can appear in a strong herd overnight, carried by birds or rats or even by a piece of infected straw; foot-and-mouth disease, mastitis, sterility, contagious abortion, foot-rot in sheep, "swayback" in lambs.

ENEMY ACTION. Left, oat-sacks ravaged by rats. Right, a field of collapsed wheat infected by the fungus disease "evespot".







CHEMICAL WARFARE. Spraying fruit trees against insect damage. The men wear protective rubber. One, perched in a crow's-nest, plays on the upper branches out of reach from the ground.

All these are natural catastrophes against which the farmer must always be prepared. For unless he knows how to guard against them, or treat them, he may lose an entire harvest grown from irreplaceable seed, or a pedigree herd which may have taken him years of careful breeding to build up. The scientist has given the farmer great help in this battle and his efforts in discovering counter-measures to combat the threat of pest and plant-sickness have been as exciting, in their own way, as the measures taken to beat the magnetic mine. Intensive research into the habits of certain pests has provided the farmer with completely new weapons;

has established, too, new ways of maintaining the health of the soil so that its resistance to disease should be increased to a maximum.

Improved methods of soil testing, for instance, reveal just what fertilisers are lacking in its make-up. The farmer, hitherto largely dependent on trial and error, now knows exactly how much lime and fertiliser the land needs to maintain its balance of health. Insecticides have been standardised. The chemical constituents of the derris insecticide, for example, have been isolated and identified, and its wasteful properties eliminated, so that the remaining product should be specially effective.

The sinister wireworm is difficult to attack directly. But methods of estimating its population in any given field have been discovered, so that the farmer may know beforehand what crops he can sow with safety. If the wireworm content is high, he will sow only those crops that are immune, such as beans and flax; if medium, he can grow barley; if low, and only then, will his wheat and potatoes be safe. By this pre-knowledge the farmer is able to control the extent of damage the pest will do, and so avoid any repetition of those last-war disasters when ravage from wireworm became, at times, so serious a menace.

Many plant diseases are being eliminated from the outset by seed-dressing and inoculation. The turnip-fly (which attacks kale and cabbage, too) is discouraged by a mixture of kerosene, naphthalene and benzine. Cereals are rendered immune to the withering Smut and Stripe diseases by dusting the seed with an organo-mercury dressing. All these precautions are just a fraction of the hundred-and-one essential bits of information the ordinary farmer must have at his finger-tips. It is all part of his heavy load of care.

As for the health of fodder-crops such as lucerne, clovers, peas, beans and vetches, whose failure to flourish in certain districts was often such a mystery to farmers, scientists

have discovered that the bacteria necessary for proper growth were often completely lacking in some soils. By inoculating the seed itself with the appropriate bacteria this deficiency has been met, and the farmers are now getting much of their seed already so treated.

Lime is essential to grass and fodder, and for neutralising acid soils. There is much natural lime in England; but in cultivated fields it has to be continually replaced, for rain washes it away, and animals take it for bone and do not return it. The farmer relies for most of his supplies on burnt lime, ground limestone, marl and chalk from the quarries, and on waste lime gathered from paper and sugar-beet mills. To help in the increase of fertility a Government scheme

had been in operation since 1937 by which farmers could obtain one-half the cost of lime or one-quarter the cost of basic-slag purchased and used to improve their land. This scheme had far-reaching effects.

A better knowledge of the value of lime and of artificial fertilisers to supplement dung saved the farmlands of Britain from serious exhaustion in the war. Supplies had to be weighed carefully against the farmer's need, for there was no surplus. And he, patiently and with imagination, had to supplement his ration by turning as much of his straw as possible into farmyard manure. Only by his resourcefulness, and by the economy of the scientist, could the land have been kept healthy and in good heart through five years of shortage and overwork.

TO KEEP THE LAND SWEET, lime, which is consumed by growing crops, must be continually replaced.



# 7

## Green pastures



MILK IS Priority Food No. 1. It is the most complete food Nature can give, and one which our land and climate alike are well able to produce. In view of this, we turned naturally to milk to replace many other foods we could not get, to compensate for the lack of eggs, butter, meat and fruit, and to maintain the health of essential workers and fighters. The cry for milk was insistent from the very beginning of war-milk to check malnutrition, milk for the mines and factories, milk for children, for invalids and nursing mothers. We were, in fact, consuming more fresh milk than ever before in our history. And in spite of the lack of imported animal feeding-stuffs and the restriction of grassland by ploughing, the farmer was selling more than he had ever sold.

How was this accomplished? It was due to the great switch-over on the part of many farmers from other forms of stock-keeping to dairy farming; the growing of increased acreages of fodder crops; improvements in dairy practice, herd conditions and methods of milking: but, as much as anything else, it was due to a revolution in the use of grass. This revolution became possible largely through the widespread adoption of the "ley" system of farming, a method long advocated by Sir George Stapledon, one of our foremost agricultural scientists.

Ley farming is a system of rotational cultivations aimed at restoring fertility to exhausted fields, and rejuvenating old pastures,

by sowing them with temporary grasses. At the same time it is a method of providing young healthy grass for the feeding of cattle. It would be difficult to over-estimate the profound effect its adoption has had upon British agriculture, or the effect it is likely to have upon its future. It was not a new theory. It had been practised for years in certain districts of Scotland, Devon, Cornwall and elsewhere, where climate and conditions are specially suitable. But to farmers in general it was an innovation, a system with unusual possibilities, and it gave them a new respect for grass.

Grass is a crop, and can be sown and harvested like any other. Moreover, it gives back to the land qualities which other crops take from it. Fields grow tired of wheat; they are sapped and destroyed by it; if sown with nothing else, their yields drop away. Farmers have been aware of this since medieval times. In the old days they rested fields by letting them lie fallow for a year or two. To-day, however, we cannot afford the idleness of fallow land; the resting and restoration of fields must at the same time be productive. Grassing may prove the answer to that problem.

But what exactly will it mean to the farmer? It may mean the end of permanent pasture altogether. For old grass is wasteful and often dangerous. If neglected year after year, it deteriorates in quality; tough weeds oust the more nutritious plants, insects

multiply in the ground, and disease-producing parasites cling to the undisturbed turf, threatening every animal that comes upon it.

The ley system is more than a purifier of land; it is bringing a completely new rhythm to the farm. Grass becomes mobile; it goes from field to field, following the plough and taking its turn with the other crops. As the arable fields show signs of exhaustion, they are sown with a one- to five-year ley of grass. The cattle are moved on to this from the once permanent pasture, which in its turn is ploughed up and sown with crops. In this way the whole productivity of the farm can be increased, the health of the soil is toned up and the cattle get better fodder.

It sounds simple enough, and the theory in fact is simple, but successful regrassing depends upon carefully balanced seedsmixtures, as well as skilful management of the subsequent crop. Grass is a broad term embracing hundreds of plant varieties, all with their own qualities and characteristics. You cannot sow any grass just anywhere for any purpose. Your special need demands its special formula. And it is here that the scientist steps in again. Research students at the Welsh Plant Breeding Station and elsewhere have for many years been breeding special strains of grasses for all purposes, climates and localities. They have evolved grass to suit highland and lowland, grasses for wet and dry areas, precocious young grasses that leap up in a few weeks and give winter-weary cattle a green bite in early spring, and other types that take longer to mature. They have selected wild grasses, crossed them, bred them, and produced pedigree strains unknown to this country before. They have imported valuable types from the pastures of Australia, New Zealand and South America, and have even recovered

FROM COUCH TO CLOVER. Left is a picture of old pasture, coarse, dry, and choked with weeds. On the right it has been ploughed and re-seeded with a mixture of new grass and clovers, trebling its food value.





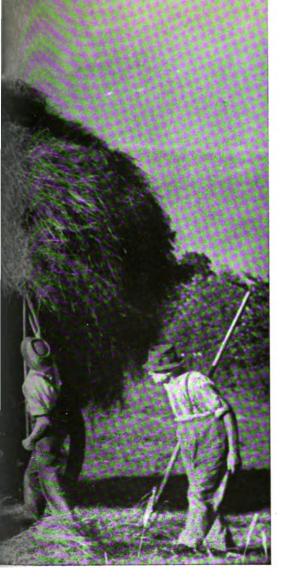


GRASS IS A CROP. Cut in its prime, knee high and red with clover, then dried in the summer sun, English grass, when good, is the best in the world.

and reintroduced to Britain certain native species which were taken abroad by emigrants over a hundred years ago and have since developed completely new characteristics. These grasses are able to play a valuable part in supplementing the more standard types that have been mixed and sown by the British farmer in the past.

Ley farming offers many advantages. It

makes it possible for the cattle to go to the regrassed pastures much earlier in the year, and stay on them much later than they could upon old grass. During the lean winter months they can feed upon mixed fodders which have been specially sown, cut and preserved by means of ensilage. Ensilage is a method of storing young green fodder so that it retains most of its original goodness.

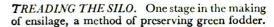


The silo, once a rare sight in this country, can now be seen on many farms. Often it is built of moulded concrete, drum-shaped, like a diminutive gas-holder. But it takes many other forms too; it may be of wire and stiff cardboard, or perhaps an old iron tank—one Lincolnshire farmer built his of railway sleepers lined with newspaper. The art of making ensilage is not easy, and it took the war to spread the practice. The fodder must be cut at exactly the right stage of growth and fed into the container just so much at a time. It must be watched continually to prevent evaporation and over-heating, and the addition of molasses must be adjusted carefully to its condition. When you saw land girls dancing round the top of a silo, they were not merry-making but treading the grass to compress it; this is a process rather like treading grapes and must be carried out with equal care.

But, complicated as it all sounds, many farmers speedily developed an instinctive silage sense; they learnt to judge its quality by colour and scent alone, and evolved their personal variations in the making of it. Though County Committee experts were eager at all times to give advice on re-seeding and silage-making, there were many farmers who took a special pride in compounding their own mixtures, discussing them at length with their neighbours, making claims, boasting of secret proportions.

In one way and another, therefore, by

Grass, clovers, lucerne, peas, beans and vetches, when cut, are placed in a large airtight container—the silo. Here they are compressed and watered with molasses to prevent fermentation. The finished product is much better than hay; it is rich, oily, and pungently aromatic, looking rather like gold-cut tobacco, and providing a food with all the concentrated nutriment of cow-cake.





embracing those new ideas, by growing roots, cabbages and kale in greater abundance, and by utilising every scrap of green-stuff about the farm, the farmer was able to bridge the bare months from September to March and keep his herds fed. And throughout this complex struggle he was aiming at high milk yields both winter and summer.

But vital as it is, balanced feeding is only one element in milk production. Breed is even more important. You may feed an inferior cow on the fat of the land, but her return in milk will be no better than her nature. Owing to indiscriminate breeding there were many such animals in this country at the beginning of war—beasts of inferior ancestry, with bad traits and big appetites, who were not worth the land they took up. A cow is not a machine; one will eat as much as another, but the amount of milk given by each varies widely. Every effort, therefore, had to be made to improve stock quality throughout the dairy industry, to cut

out such passengers as there might be, and to concentrate on the higher-yielding animals. This was done. In place of the occasional mixed herds of happy-go-lucky, lump-backed, ill-conditioned animals, you could now see more and more clean, beautifully formed cattle coming on to the land; tawny, heavy-uddered Jerseys, red and roan Shorthorns, strong-limbed Ayrshires, and smooth-flanked Friesians dappled with black and white.

Heifers are judged from one standpoint only — calf-bearing and milk-production. Their looks, build, stance, shape of hind-quarters—all point to this. But only after calving can their value be properly assessed. Milk-recording, a regular survey of the yield and butter-fat content of each cow's milk, enables the farmer to isolate the valuable animal from the passenger and to adapt his breeding policy accordingly.

The aim and ambition of every farmer are to establish his own pedigree herd, bred to his own requirements. The days of indis-

SUMMER GRASS for winter feeding can also be preserved by an artificial drying process. Cows must be fed well or their milk yields will decline.





THE FARMYARD DROWSES in the midsummer afternoon. Slow, heavy with grass, red and roan Shorthorns amble in from their pastures ready to be milked.

Digitized by



MECHANISED MILKER. Clean, swift, time-saving, this machine milks by compressed air. And cows, being creatures of temperament, like it; its gentle rhythm soothes them.

criminate bulling are numbered. Bulls are now carefully judged on the qualities of their progeny. A bad bull goes swiftly to the slaughterhouse, but a good one is prized above all else, for on him the herd is built and from him comes all its distinction.

But, because so much depends on the right bull, they are expensive and not everyone can own one. In some districts farmers clubbed together for a first-class animal and shared it out on a co-operative basis. Artificial insemination, developed so successfully in Soviet Russia, was tried out, too, on an increasing scale. In this way a good bull can be used to the best advantage, and can inseminate distant herds, by means of the test-tube, at the rate of over ten cows a day. A few stations were set up to experiment with this method, which is likely to have a profound influence on the future of stock-breeding in Britain. In short, the bull, and the way he is employed, have become the responsibility of the whole farming community, and bad bulls are no longer tolerated as they once were. For there is no worse tragedy, when you are building up a good herd, than for the wrong bull to be found running with the heifers.

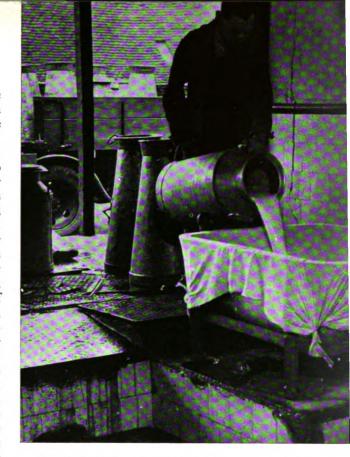
That the children of this country were spared the horrors of malnutrition is due very largely to the extraordinary energy of the British dairy farmer, and to the Minister of Food, who guaranteed that all children under the age of five and all expectant mothers

should get their pint of milk a day. He would not, he said, see the future generation suffer for the follies of the present. The farmer seemed equally determined.

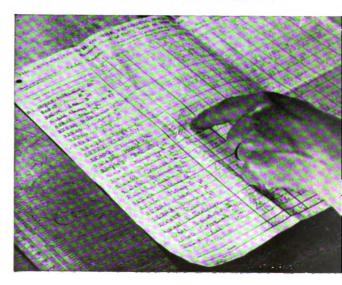
In the 1914-18 war, milk-production fell by some 40 per cent. There seemed no reason to suppose it would not suffer equally in this one. Yet, in spite of severe conditions and hard winters, the consumption of liquid milk broke the highest of peacetime records. Some people may be surprised at this; they were almost certainly not getting quite as much milk as they would have liked and they may wonder who was getting it. The children and the mothers were getting it. The rest of us could survive a shortage; these could not, without danger. Nevertheless, the consumption of fresh milk in 1944 showed a 40 per cent. increase above that of pre-war.

Winter milk-production was one of the farmer's greatest problems: summer milk can usually take care of itself, but winter is always a time of shortage. Many steps were taken to reduce this margin, chiefly by the feeding of specially grown fodder and silage already mentioned, and by arranging for late-autumn calving so that the cow might meet the winter with a natural flush of milk.

Dairy farming is no fun at the best of times: you work through all the hours of daylight, seven days a week. Cattle need care and attention whatever day it is. In winter you are up long before sunrise. At calving time you are often up all night. You milk twice a day, dawn and afternoon. You have to wash down each animal, feed it, milk it, clean the shed, clean yourself, and ensure the purity of the milk, over and over again, day after day. If that were all, it would be quite enough. But many dairy farmers, unused to cultivation, had to take that up too-planting roots, growing fodder, making silage, in order to provide their cattle with food that was once dropped at the door in bags. They did not assume these new responsibilities just for the love of the thing. Or for the money. Their work was real war service.

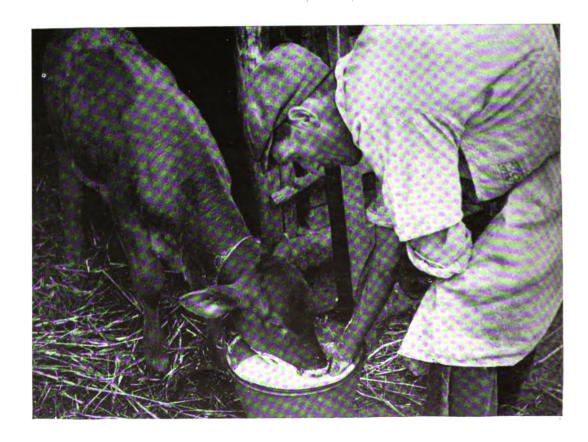


FILTERING gives clean milk. Recording each day's yield distinguishes the good cow from the bad, and shapes the farmer's breeding policy.



Meanwhile, with the better class of beast beginning to dominate the herd, with standards of health, cleanliness, feeding and methods of milking all undergoing revolution, there was being built up in this country a dairy industry that had never been in better shape. The farmer had behind him a vast national organisation, the Milk Marketing Board, his own creation, which regulates in peace time farmers' sales of milk and the prices they receive, and guarantees a sure market. The Ministry of Agriculture for its part had set up a national health service for cattle, while officials of the W.A.E.C.s were always ready with reliable advice and assistance on matters affecting

milk-production and cow-keeping generally. The high stage of development reached by the dairy industry in this country was not achieved by letting something else go hang. On the contrary, it was planned and adapted to suit the whole economy of the farm, and had a definite influence for good throughout all its branches. Re-seeding of grassland, the increase of home-grown fodder, the building up of first-class herds with regular health inspections, all these activities worked in with one another to attain a higher standard of production all round. extraordinary wartime increase in milkproduction was but one sign of the vitality of present-day agriculture.



## Farming in Scotland



SCOTLAND is not a rich country by nature. In area it is small, about one-sixth the size of Britain, yet it contains many types of landscape and a diverse range of soils. From the rolling green Cheviots and the swift tides of the Solway Firth away north to the shaggy Shetlands in the latitude of Labrador, and from the fertile fields of its eastern coast westward to the rain-swept, wind-blown Hebrides, no comparable area in the world perhaps can show a greater variety of agricultural conditions. All types are worked there: potatoes and grain grown in record crops on the old red sandstone of East Lothian; sheep- and cattle-raising on the southern uplands and the highland hills; and the meagre and often still primitive cultivation of tiny crofts scattered over the peat moors and mountain valleys of the far west, where Atlantic gales beat relentlessly on a struggling vegetation.

In many parts of the country agriculture is no easy business. The natural beauty of Scotland is prodigious and laid out with a lavish hand, but in soils that are kindly and easy to cultivate she has not been so generously endowed. Neither has history made the task of her husbandmen any less exacting. Sir Walter Scott, in his Tales of a Grandfather, says that "The generation of which I am an individual . . . have been the first Scotsmen who appear likely to quit the stage of

life without witnessing either foreign or domestic war within their country". And fighting and farming go ill together. But as the days of internal strife and border warfare receded into the past, Scotsmen turned themselves to the conquest of the soil and won many victories, often against heavy odds. Land was laboriously reclaimed and patiently tilled, new methods were adopted, livestock was improved. Within the limitations of its cultivable area, Scotland achieved high levels of farming and food-production.

But that area is limited indeed; of Scotland's 19 million acres only about 4½ million are tillable; of the rest, 10½ million acres are rough hill grazings, while a good part of the remainder is mountain land capable of supporting little but deer and game.

Consequently, war found few Scots farmers in a position to make spectacular gains in output. They did not have great stretches of rich permanent pasture, with its accumulated fertility waiting only for the plough to transform it into human food. But they were able to break up such old grassland as they had; they could reduce, too, the proportion of grass on their arable land; and they could intensify cultivation all round. These things they set themselves to do, immediately and with energy. Their plans had been prepared in good time.

On the first day of war the Scottish



THE BANKS OF THE TWEED. Pine woods and walled fields, heather and grass, sheep on the slopes and salmon in the river. Such is the eastern border country of Scotland.

Department of Agriculture was able to call together some of the best farmers of every district to form the local Agricultural Executive Committees. These Committees, armed with their special powers, operated similarly to those in England, save that they were even more decentralised. Their first job was to increase cultivations wherever this was possible, but their plans had to be adapted

to suit different districts, for Scotland is illbalanced and intensely regional in its geographical lay-out, and no one plan could cover the country as a whole.

There are three main branches of farming in Scotland, dependent upon the distinct character of three areas. In the east, from the Moray Firth down to the Berwick border, lie the fertile lowlands of the coastal



counties where most of the arable cropping is carried out. To the south-west stretch the dairy counties of Ayr, Dumfries, Kirk-cudbright and Wigtown, their climate softened by a Gulf-stream sea which warms their winding shores. To the north and north-west, in the Highlands and the islands—a considerable slice of the country—the land is mountain moorland, grazed by

sheep and cattle on the heights and tilled by crofting communities in the lower valleys. Each of these areas lives a special life and has its own local problems, so that it had to approach the war in its own way. Each was able to adapt itself and make its special contributions.

The green arable belt in the east has always been a natural cropping country. The land slopes up from the sea westward to the hills and remains good, much of it very good indeed, until the higher levels are reached. Here the rearing and fattening of livestock have long been complementary to the growing of crops. Yet by the outbreak of war, in spite of the fertility of this soil, only one-third of it was cultivated. Hundreds of thousands of acres had gone back to grass and were being dominated by more and more cattle and sheep. much of the rest of Scotland rough and resistant to the plough, the task of supplying the necessary increases in cultivations, which in England could be taken from almost anywhere, fell largely to this area alone.

Expert calculations prove that whereas 100 acres in beef or mutton can feed nine people for a year, the same area in milk can feed 40 a year, in oats 170, and in potatoes 400. So the beef and mutton would have to be cut down. The Scottish farmer has long been in the habit of taking the plough round the farm, following his crops with temporary grasses. He worked a six-course rotation: oats, roots, oats or barley, then three years of grass. But even then, with 20 acres of arable, he might have as much as from 60 to 100 acres of permanent grass on his higher land. He was now asked to cut out one year of his rotation grasses in favour of a food crop, and to push his cattle farther up the hills away from the better permanent grass, which could then be ploughed.

And so the plough came to the grass, here, as in the south. Although, to the farmer's mind, much of it was ordinarily not worth ploughing, he was content to do it for the

sake of the extra number of people he could fced. The first target was a stiff one, and it was not achieved without difficulty, for war brought its own special handicaps. The Seot springs from a long tradition of fighting men; he has a flair for battle, and the kilted Highland regiments have always been numbered among the crack troops of the British Army. Many thousands of young agricultural workers, therefore, already veteran Territorials, were called to the colours at the first Proclamation, and at one stroke the farmer lost a quantity of his skilled labour. Tractors, too, which might have compensated for that loss, were very scarce, and for the first two years there were practically no crawler types at all, though they were more urgently needed on the steep, tricky fields of Scotland than anywhere else.

But the farmers held out and increased their cultivations as best they could, until the shortage of labour and equipment was eased. Presently they got the tractors— 16,000 of them. They got 7,000 land girls to help to operate them, and nearly 300 blacksmiths, trained in oxy-acetylene welding, to provide maintenance centres in the scattered parishes. With rocky fields, steep hillsides, and many acres returning to rough moorland, it was not a straightforward job, but the area brought under the plough was well past the 1918 peak of the last war.

What was produced from this new land? Oats, of course. Oats that grow anywhere, in hard climate, on high or low land-oats for the porridge of north and south, and to swell the spare rations of the dairy herds. The production of this crop increased by 50 per cent. Oats are food for man and beast, and there are none better than those grown on Scottish soil. Potatoes, too, both for seed and table. Scotland is the nursery of the British potato, and its soil the source of many types long known and fancied by farmers and gardeners everywhere. The importance of the potato as a wartime food needs no further stressing, but it may not be generally known that the bulk of the vast

THE RIGS O' BARLEY. One of the old crops of Scotland, grown in the eastern counties; the base of good bread and malt.

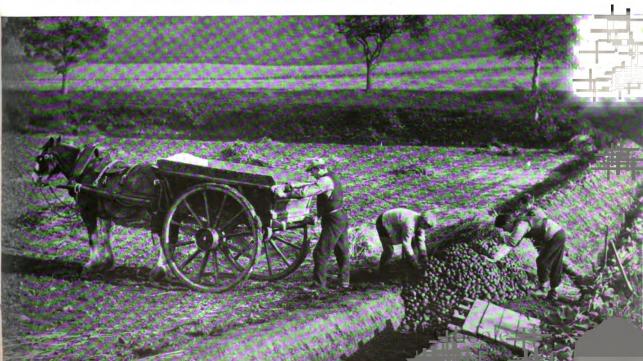


new acreages planted in England during the war were sown with Scottish seed. For a very good reason too. If the English farmer plants his own or local seed for more than two years in succession, it runs the risk of contracting serious virus diseases. In Scotland, however, the cooler climate tends to keep the seed sound and healthy.

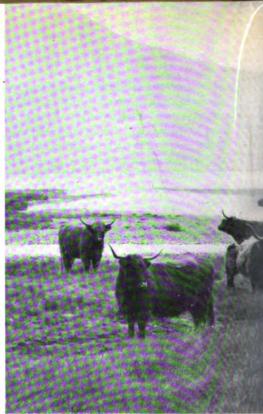
So there was unprecedented activity in the potato-fields of the north, more and more land being ploughed and planted. There could not be too much seed grown. You would find the machines out ridging the new fields early, for frost is a spiteful visitor right through the spring. By June and July you could see the red, purple and white flowers of the plant spreading in the soils round Loch Leven, in Cromarty, Black Isle, Aberdeen, Angus, Perth, and throughout the Lothians. And later the lifting and riddling of seed, the women and children packing them like thousands of golden eggs ready for shipment south. They were handled with special care, since they were the seed for the whole country—for the million-ton harvests to be produced on the English farms and the reclaimed Fens. These harvests would hardly have been possible but for the exertion and drive of the Scots seed-growers. Altogether they were exporting to England nearly half a million tons a year in seed alone—about four times the quantity exported before the war.

Other crops, both new and old, advanced up the sides of the eastern valleys, ousting the old grasses, and demonstrating to the farmers what the plough and a cartload of lime can do with land that once seemed old and tired. In Moray, Fife, the Lothians and elsewhere, the barley once grown for whisky was now grown in greater quantities for other uses. Enough flax fields arose to supply the needs of several new factories; and sugar-beet, that most unpopular plant, showed its broad leaf on many farms in spite of the farmer's natural inclinations against it. Wheat, a normal and satisfactory crop in a few favoured eastern areas, was springing

SEED FOR THE SOUTH. Scotland is the nursery of the British potato, and its soil the progenitor of many famous types long grown and fancied everywhere.







#### BLACK ANGUS BEEF STOCK.

up on double the pre-war acreages. And round the Firth of Tay, where the climate is especially fair, the autumn fields were smothered with acres of crimson raspberries.

But none of these crops can be relied upon till harvested. Winter ploughing in Scotland is faced often with extreme difficulties, the year is long with labour, and harvests are tedious and slow, sometimes trailing late into November. As year by year the burden of harvests increased, the farmer's difficulties increased also; but, as in England, he received welcome help from velunteer workers. All round the Firth of Forth, and from Aberdeen to Berwick, they came from the smoke-belts of industrial Glasgow and the Clyde to live in camps and spend their holidays in the fields. Many schools closed down altogether in October to cope with the potato harvests. "Those schoolchildren", said a farmer, "have been lifting my

LONG-HORNED HIGHLAND STEERS.

potatoes right out of the jaws of winter." For when the frosts come in November, it is then too late.

You would see fewer livestock in the east then, but you would still see large numbers. Though hampered by loss of pasture and feeding-stuffs, the farmer made every effort to keep up the nucleus of his herds. For some were breeds of ancient fame, the disappearance of which would have been a disaster to the whole pastoral industry.

Scotland is famous for its beef breeds. Pedigree herds of Shorthorns and Aberdeen-Angus, many of world renown, are dotted throughout the arable areas of Scotland. Each spring, before the war, bulls of these breeds in the markets of Perth were fetching four-figure prices from buyers representing breeders in all parts of Europe and the Americas. The sleek, black, smaller-boned Aberdeen-Angus breed had its birth in the





AYRSHIRE DAIRY CALVES.

Scottish counties from which it has taken its name. These "blacks" are still being raised in their native valleys. Aberdeen storecattle, fattened on local turnips and oatstraw said to possess a feeding quality unknown to the rest of Britain, still yield their fine beef long famed in the markets of Edinburgh and London. In the flat windswept fields of Caithness, in Easter-Ross, in Black Isle and Moray, and along the foothill fringes of the southern arable counties, cattle raised in Ireland are brought every year to graze on those pastures unfit for ploughing, or to feed on the oat-straw and roots provided by the cropping rotations.

Almost anywhere in Scotland you find sheep, and in the great hill grazing areas you are indeed more likely to see a sheep than a man. The east is still a great mutton-fattening area. Lean, hardy Blackface lambs and Cheviots, bred in the Western Highlands,

come down to thrive on the sweeter lowland grasses in autumn and on the succulent turnips in winter. Cattle and sheep are an integral part of the Scottish arable system and so must be conserved as far as possible, for they bring a fertility to the soil which nothing else can replace, and they are the native strains upon which much of Scotland's wealth depends and will continue to depend in the future.

For the famous dairy herds of Scotland, we turn south-west to Dumfries, Kirkcudbright, Wigtown and Ayr. This is not lush land, but it is warm and the rainfall is right for grass. A broken spine of granite mountain rises steeply through the middle of the area, a gaunt wall to catch the wind, and a home for sheep. On the green lower slopes that run towards the sea grow the pastures where the milk herds graze. Here you will find the small, wedge-like, red-and-white Ayrshire

cows, which have been bred in these parts for generations, and on the poorer land shaggy, long-horned Highland and Galloway steers cropping the rough grass. From here, too, come the powerful Clydesdale draught horses, long-maned, feathery-hooved, and splendid in action.

This is a dramatic countryside, impressed throughout with signs and memories of old Border warfare. From the farms of Grey Galloway you can look out over the Solway Firth to the far blue hills of the Cumberland lake district. But they suffer from isolation and poor transport facilities. bygone days the farmer had to turn the bulk of his milk into cheese, because that was the only way he could get it safely to market, a hundred miles away. The wartime demand for liquid milk forced him into a new life. Cheese-making on the farm finished, and his herds must be constantly improved. Moreover, the war proved a great stimulus to the eradication of tuberculosis. This district had been a pioneer in voluntary milk-recording and in the fight against tuberculosis, a consistent policy which resulted in a tremendous demand at high prices for native Ayrshire stock. But, among other changes, the dairy farmer had now to go out and plough for winter fodder, and that is something he had no need to do before.

Ploughing was not nearly so simple for him as for the dairy farmer in the south. His fields, though covered for the most part with good grass, are prone to sudden treacherous outcrops of rock. Throughout Grey Galloway the fields are split and torn by lumps of granite which give the landscape the look of an archipelago—a green sea broken by thousands of small jagged islands. And just as many lie invisibly submerged, covered only by a thin skin of turf. Yet between these rocks the soil goes deep and is good.

To plough such land without breaking a hundred plough-points called for an intimate local knowledge of each field. The ploughman had to guide his plough as delicately as a pilot bringing his ship to a rocky harbour. The Galloway farmer did this—ploughing in small patches, jumping and skirting the rock, an exhausting nightmarish job, but a job nobody else could do for him. Neither were tractors of any use to him here; it was a job between local man and horse. But it was worth doing all the same, and for the sake of winter milk and winter feeding—a far graver problem in Scotland than anywhere else—it had to be done.

The demand for milk gives rise to problems which continue all the year round; the pedigree farms of Ayr, Lanarkshire and Renfrew are conscious all the time of that vast industrial area around Glasgow of three million dependent workers, whose need cannot be wholly appeased in spite of the farmer's every effort.

From the pastures to the granite mountains which invade this whole dairy country, we again find sheep, always sheep. clinging precariously to the slopes, picking fastidiously among the sparse grasses, surviving still where little else could. It is here that a highly successful experiment in sheep migration was undertaken by the Department of Agriculture. Three years ago a certain area in the Northumberland hills was cleared for military purposes and a flock of 2,000 local Blackface sheep thereby rendered homeless. They were a good stock of ancient standing; in fact, the head shepherd had been with this particular fold since boyhood, and his father and grandfather before him. It seemed a pity to break them up and scatter them now. So they were adopted by the Scottish Department, loaded upon two special trains, carried 150 miles, and set down on a derelict moor above Castle Douglas.

It was a tricky venture. You do not move sheep at all easily; they have a special fondness for their familiar hills and grow obstinate or hysterical away from them. But this flock was soothed into its new home by five experienced shepherds who spent the first winter months leading them along the unfamiliar mountain runs. Nevertheless, when the snows came, heavy losses were expected, for the sheep would not know where to find shelter. But fortunately the weather was mild, and by the following spring the ewes were so weathered to the new surroundings that they settled down to a lambing which was highly successful. This experiment, an unusual one for Scotland, maintained unbroken a first-class flock and provided a steady flow of mutton and wool from a hill which was otherwise unused.

Away from the arable areas and the cities, away to the north-west, lie those 10,000 square miles of Scottish Highlands loosely described as "crofting and hill-sheep pasture". They stretch from Perth and Argyll, through Inverness, Ross, Sutherland, and include the Hebrides and the Shetland Isles: ranges of mountain, loch and forest, heather and bracken, rock and yellow grass. There is no other land like this in the world. And there are no other people quite like the crofting communities which live upon it.

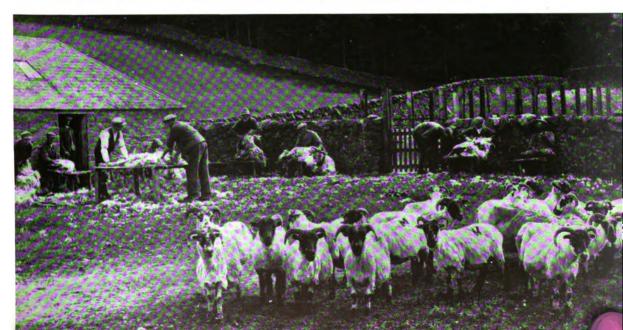
There are perhaps no more than a couple

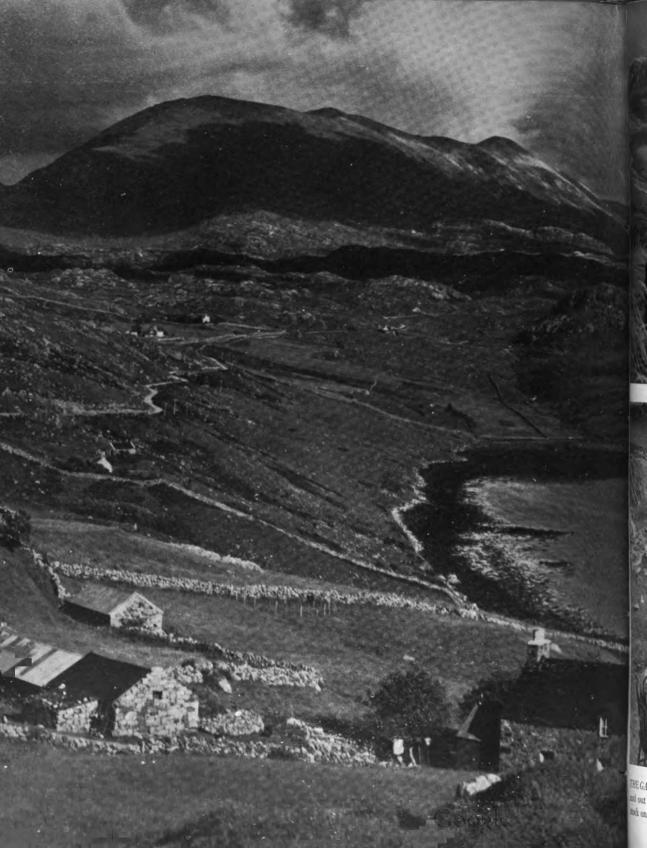
of hundred thousand of them in all that scattered region; but they are a fixed and jealous population, bound to their crofts and their mode of life by the strongest ties of blood. They are among the most Celtic of all Celts and still retain the most apparent indications of their origin in looks, speech and music. Until the advent of the railways 70 years ago, they were wholly Gaelic-speaking, and the Gaelic remains still the natural tongue used by the old folks and by the children at their play.

Their crofting system is homogeneous and has a strong communal basis. The crofts are hereditary family small holdings, lying grouped together around the shores of the lochs and along the banks of the rivers and upon the saw-edged western and northern sea coasts. The holding will be only a few acres of tillable land, each marked with its steading and cottage and carrying its bare subsistence crop of oats or turnips. On the coast the crofter will divide his time between sea and land, part farmer, part fisherman.

These small holdings, grouped into communities or "townships", represent the

THE CLIPPING. Gathered from the hills in the late spring, the sheep are shorn, rebranded and turned loose again. Their wool is a modest though steady source of income.









THE GAELIC CROFTS lie along lochs and rivers, around the north-west sea coasts and out among the islands. Each crofter works his own small field and runs his stock on the communal grazings in the hills. Life here is hard, but self-sufficient.

greater part of the tillage area of the Highlands; they are small indeed, but above them hang the great mountains, and upon these the crofters have almost unlimited grazing for their livestock. Townships frequently run a communal fold on the hills, but in general each crofter has grazing rights attached to his holding; these are often based on the annual value of the croft and allow him to graze so many sheep or cattle of his own. The seasonal tasks of lambing, dipping and shearing of sheep are shared by the whole community. When the wool is clipped, it is spun and woven by the women and shrunk into fine tweeds. The crofters are a hardy lot and live a life with little margin for comfort, though plenty for happiness. Their whole existence has been devoted to the task of coaxing food from surroundings that are anything but bountiful. War did not make their lives any more austere or active than they normally were.

But war brought several peculiar influences to the Highlands, and many positive benefits. The hill-sheep industry, as distinct from the crofting settlements, had by 1939 reached the lowest ebb in its history. Hillsheep farming proper consisted of huge folds of Blackface, Cheviot and Shetland sheep which stayed on the hills winter and summer alike, breeding there and foraging for themselves, providing wool for their owners, and lambs for fattening on lowland farms. But the popular taste for this slowmaturing mutton had decreased. Highland cattle, too, were fast disappearing, and bracken was spreading like a plague up the glens, till the sheepfolds remaining could hardly find sufficient pasture to keep alive. A proper balance of sheep and cattle had to be restored to the hills, and a special type of ewe bred to meet modern conditions. To effect this, the Department of Agriculture backed up the hill breeder and supplied on hire first-class rams and bulls to father the necessary types.

Both for the sake of the Highlands and for the sake of our food-stores, the glens had to be grazed. The Department took over a quarter of a million acres of unused deerforest, and grazed them with large flocks of sheep and hill-cattle in the care of crofter-shepherds and herdsmen. In 1942 five of these flocks produced a total of 165,000 lb. of mutton, 54,000 lb. of beef, and 73,000 lb. of wool from erstwhile forsaken glens.

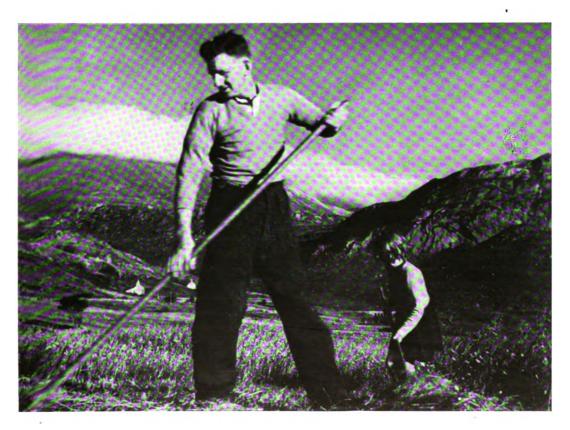
These deer-forests are not, in fact, forests at all any more, for the old Caledonian forests which once covered them were destroyed by fire centuries ago. They are now those breath-taking craggy glens, spouting with ice-blue streams and hung round with mist and rain, the coloured counterfeit of which one may see framed upon a thousand parlour walls. For some years past, this type of country had been devoted to deerstalking at the expense of sheep. The crofters themselves did not mind so much; it brought them certain advantages. They often earned good money as gillies and beaters; and, fortified by the old Gaelic saying, "It is no crime or shame to take a fish from the river, a tree from the forest, or a stag from the hill", they saw to it that many a haunch of good venison found its way home to sweeten their frugal cooking-pots.

Deer-stalking, however, is not a wartime industry. Deer and sheep can live together; there is room for both in the right propor-But by 1939 the protected deer population had so enormously increased that the land in many areas had grown too coarse for sheep altogether. So the official eye fell upon the deer, and thousands were condemned for the sake of their flesh (unrationed) and for their living space. Large expeditions were organised in which whole crofting townships took part, and the superfluous animals were tracked down and shot. The land was then re-sweetened for the sheep, the drains reopened, heather burnt, the bracken cut down. Innumerable sheepruns were restored in this way.

By everything in their power the Government encouraged the hill farmers and the crofting townships to restore balanced grazing to the glens and to exploit once more the productivity of those vast areas in the most natural way. This may be no land for the plough, but it breeds good meat.

War did not solve the Scottish agricultural problem, or make life any simpler for the Scottish farmer. But at least he could see before him a promise of great developments once the restrictions of war were lifted.

He ploughed more widely than for a hundred years, fertilising, liming and cleaning his land, planning his livestock breeding and getting accustomed to the temporary heaven of an ordered market. He had before him the example of a Government organisation fixing prices; hiring him labour and machinery; selling him seed; sharing the cost of his ploughing, draining and land reclamations; supplying him with stud horses, bulls and rams for his stock; analysing his soils, giving him expert advice on all his problems, animal, vegetable and mineral; and, finally, buying his produce from him, or at least guaranteeing its sale. He felt his scope increasing in spite of wartime limitations, for he brought Scotland nearer to self-sufficiency in food than she had been for three-quarters of a century, and that in the face of war and a vastly increased population. With this experience behind him, and the abundant facilities of peace before him, what new heart and fertility may he not bring to his rugged but magnificent countryside?



# Ulster: a country of small holdings

IN NORTHERN Ireland, the story of the wartime farm was very similar to that of Great Britain, differing in detail, but much the same in achievement. There were similar shortages in tools and labour, a similar drive to plough up old grass, the same efforts to produce more from less. But there was a difference both in method and in the type of crops grown, for the Ulsterman farms a different sort of land and he farms it in his own way.

Northern Ireland is barely the size of It pivots around the wide fresh waters of Lough Neagh, and in appearance suggests Cumberland or Cornwall. mountains of Londonderry, Antrim and Down are rough, gorse-covered, and cropped with volcanic rock. The land is loaded with historical relics, ruined castles and Celtic crosses, old battle-grounds, peat bogs, swift-running rivers, and gentle valleys of good soil. It is a country farmed chiefly by small peasant proprietors, a land of small holdings worked mainly by the family itself, and there is consequently a smaller proportion of outside labour. There are no landlords here and no big estates; the family works and lives on its own land, and 70 per cent. of all holdings are less than 30 acres There are, in fact, a greater number of farms in the six counties of Ulster than in the whole of Scotland.

Ulstermen have always inclined to mixed farming, having many irons in the fire at once and working the whole agricultural gamut—cattle, sheep, pigs, poultry, nilk, grass and cultivations. In this way they were well insured against disaster. If crops failed, they lived on their livestock; if eggs or bacon slumped, then they had other alternatives. This reluctance to specialise stood them in good stead through the great depression between the wars, which hit them less severely than it did many of the single-department farms of Britain.

Moreover, when war brought its demand for increased cultivations, the Ulster farmer was pretty well prepared. He merely had to concentrate on the arable side of his business, and it caused him little upheaval. For many years he had been farming his few fields on a system of planned rotations which only came to the South of England with the wartime introduction of the lev system. His method was to plough up a field of grass and sow it first with oats, then flax, then roots (potatoes, mangolds or turnips), then oats again undersown with grass. The grass following the final crop of oats was cut for hay the first year and subsequently grazed. After grazing, a period of restoration lasting from two to five years, the plough returned to the grass and the cycle began again. This method catered



PEASANT PROPRIETOR. His cottage lies snug beneath the hills of Antrim. He keeps a few pigs, some sheep and poultry, has a field of barley and a cow in milk.

both for crops and cattle. A proportion of the rye-grass grown was saved for seed, for three-quarters of the world's rye-grass seed comes from Northern Ireland. Thanks to the rhythm of this rotation, already well established, the farmer was able to move easily into war production, to increase his output of crops and to maintain his head of cattle.

The control and organisation of the food front were in the hands of Ulster's Ministry of Agriculture, which operated its own variations of the English system. The prewar County Agricultural Committees were taken over and equipped as Divisional Headquarters to direct campaigns and strategy, and their staffs were well stiffened by additional technicians and experts. The farmer worked in direct contact with the Government; it sold him his seed, fertilisers, machinery; it bought nearly all his produce. This represents millions of paper transactions and much heavy staff work. But the farmers' personal leader, a civil servant, was the Area Tillage Officer, an experienced man of the soil who went out to the fields, advising, directing, assisting, and keeping constant watch on all operations.





 $\it HARDY\ CROPS$  for a hard climate. Above, oat-harvest in Glenariff; below, the "retting" of flax—the first stage in the making of linen.

Digitized by Google

The first signal for general action came with the Government's Tillage Order, issued at the outbreak of war. It required every farmer without exception to plough up an additional percentage of his land. The farmer could decide for himself which fields to plough, but the increase was compulsory, and it spared no one. Consequently, each did his share without question and jumped heavily upon his neighbour if he suspected any backsliding. As a result of this Order, the land under crops in Ulster had increased by over 80 per cent. since 1939.

For a country of small farmers this was a considerable achievement, and it was carried out on top of many other commitments such as stock-raising and poultry-keeping. labour problem was as acute here as in England, but the farmer was helped financially by a number of Government schemes. Tractors and other farm tools, Lend-Lease or home-produced, were all controlled by the Government and issued only to those in Farmers could buy their greatest need. tractors on a special hire-purchase system. Many holdings were, of course, too small to possess much modern equipment, but they frequently needed its help all the same. So the Ministry of Agriculture arranged for tractor-purchasers to plough up their neighbours' fields at fixed rates of pay. This helped the owner to meet the cost of his machine and spread the benefit of it over a much wider area. By certain land improvement schemes farmers were assisted in bringing much second-class land back into production. The Government bore a large proportion of the cost of the lime and basic-slag needed to revitalise sour fields. It paid 50 per cent. of the cost of operations aimed at reclaiming bogged land and flooded areas-cleaning streams and ditches, opening hill drains, and clearing gorse from the higher lands. It also paid a subsidy to hill-sheep farmers, to help them maintain their flocks and to offset the decreased demand for store-sheep resulting from the plough-up of lowland grass.

In the building of flax-dams, so important to the flax industry, the Government bore the whole cost. Flax was the most vital wartime crop grown in Ulster. It was not a food crop, but an essential raw material used particularly in the manufacture of aircraft fabrics, flying suits, parachute harness, machine-gun belts, and so on. The Belfast linen trade, once largely dependent upon imported fibre from Latvia, Lithuania and Estonia, was now wholly supplied from local produce. Although in Great Britain we had begun to grow flax in large quantities, Ulster farmers had a much longer experience of it and were producing more than twice as much as England and Wales put together. Ulster farmers process their own flax, producing the retted fibre which is the only material that can be used where great strength and reliability are essential. The green flax, strawgrown and sold by English farmers, was used for coarser fabrics and this released as much of the Ulster flax as possible for more vital requirements. Flax growing and scutching is part of the Ulster countryside; flax fields give to it that particular blue-green colour which is all its cwn, and the streams and rivers are strung out with flax-dams and scutch-mills, some the overgrown relics of older days but the majority newly built to cope with the needs of war.

Care of the flax crop demands experience and a deal of personal attention. The plant must be pulled by hand, delicately and gently. It is true that machines exist for this operation, but they are few, and the crop is so frequently battered and tangled by rough weather that only the hand can deal with it effectively. After pulling his flax, the farmer still has much to do. First he carries it to the dam, going in up to his thighs to spread it out on the stagnant Here it remains from seven to twelve days while the gums and woody matters soak and rot away. When sufficiently "retted", it is removed from the dams and laid out on the fields to dry. After gathering,



ULSTER PASTORAL. County Down sheep, long-fleeced and black of face, browse in their morning shadows on the slopes of Lurigethan.

the flax is built into "barts" where a final drying takes place. It then goes to the scutch mill, where it is scutched over rapidly revolving handles which separate the pure flax fibre from the woody material. Finally the finished fibre returns to the farmer, who in war time carried it to the flax market and sold it to the Ministry of Supply at a fixed price. During all these operations the farmer never loses sight of his flax; from the field to the Ministry of Supply its quality remains his constant care and responsibility. Since 1939 flax acreages were increased four and a half times.

The chief food crops coming from the new-ploughed lands were oats, potatoes, cattle fodder, and barley. In County Down a certain quantity of wheat was grown, but on the whole the climate is too treacherous for wheat Oats and barley were the toughest crops, and oats was the crop produced in the greatest quantities. But at harvest time the flax crop, being the most sensitive of all,

must be taken first, while the others await their turn. Because of this, and a spell of vile weather, the 1942 and 1943 harvests were long and bitter struggles. Those two seasons were the worst Ulster has known in 50 years. Much of the corn lay flat and could not be dealt with by the usual binders, and the harvests dragged on right into November. But thanks to the help of soldiers, British and American, and of schoolboys and students, the harvest was saved.

As for cattle, here Northern Ireland is in a particularly strong position. Her dairy herds increased in spite of the shortage of feeding-stuffs. On an average there were 4½ cows to every holding; milk was unrationed and its consumption increased by over 100 per cent. Free milk schemes for children and mothers operated as in England; much surplus milk was evaporated and tinned for the Forces, and in the winter thousands of gallons were shipped daily to Scotland. The pig population, alas, was cut to a third;



ULSTER POULTRY. From hens like these came sufficient eggs each year to supply Greater London with its wartime ration.

one looked in vain for the magnificent Derry hams of old. But the number of sheep and bullocks raised on the hills made possible not only the supplying of all home needs but the exportation to Britain of millions of pounds' worth of meat each year—a noble contribution from so small a country.

The purchasing, slaughtering and disposal of all livestock were carried out by the Ministry of Agriculture, acting as agent for the Ministry of Food. There were no middlemen in Northern Ireland. Every cow, bullock, sheep or pig, from every holding in the country, was sold direct to the Ministry, graded by its own officials, killed in its own abattoirs, and sent direct to the butchers' shops or on hoof straight to the docks for shipment to England. efficiency of this method saved the time wasted in individual bargaining, guaranteed the quality of the meat, and made full use of the by-products which are so often lost in the casual market. Government cleaning centres

were built to deal with all hides, skins and offals; they set up their own tanneries and triperies, and even salvaged certain animal glands for medicinal purposes.

The maintenance and development of herds in Northern Ireland confounded the Ulster's experience showed that the more land there is under cultivation, the bigger the head of stock that can be main-During the pre-war agricultural depression, when the price of grain was falling throughout the world, sheep, poultry and pigs were the salvation of Northern Ireland. And during the war poultry remained its strongest arm. The poultry population increased steadily there since the outbreak of war. The Ulster hen had long since ceased to be just a farmyard animal. It was the biggest single item in the farmer's income, housed and looked after with all the care and attention such an important contributor to the income deserved. It was in the fields, not in the buildings of the farmyards, that Ulster's poultry flocks were to be seen.

For some years before the war Ulster had a national scheme for the grading, packing and distribution of eggs, which worked so efficiently that it received world-wide recognition and was even adopted by Northern Ireland's competitors, the Danes. Eggs were sold by weight, not by number; a chain of packing stations throughout the country took them straight from the hands of the farmer and passed them on to the ports and cities, maintaining a constant flow so that stocks were never held up and always arrived in the best possible condition. In the war this machinery worked double time.

Eggs have never been short in Ulster; had the people chosen to keep their produce to themselves, we might well have envied them. In 1941, however, they submitted to a rationing scheme in every way as severe as our own. It transformed their country

overnight from one in which you could buy eggs by the basketful to one where they were almost as scarce as oranges. Although they were producing greater quantities than ever before, the civilian got no more than his bare allotment of two to three a month. The entire surplus, and it was considerable, was shipped to Britain. We got 80 per cent. of all the eggs they produced—enough, in fact, to supply the whole of Greater London throughout the year. Such a gift, in those days, was a sacrifice indeed.

The small farmers of Ulster made a remarkable showing in the war; they took its problems in their stride, and turned their versatility to the best account. In spite of a broken, rocky country, treacherous weather and all the usual shortages, they stepped up production on all sides; their tiny holdings worked to a common plan, and in flax, meat, milk and eggs made prodigious contributions to the war stocks of the nation.



### 10

## New life on the land



LAND is a pretty good mirror of man's state of mind. It reflects his outlook, his way of life, his standard of civilisation. A countryside of weeds and broken hedges will point surely to the demoralisation of the community living upon it, just as well-ordered cultivations will show its self-confidence and power.

The farmer must be judged, not by the look of him, nor by the clothes he wears, but by the way he treats his land and keeps his stock. The British farmer speaks well for Britain. Living as he does, he knows very well just what Britain means. But he expresses what he knows in farming, not in words. As a member of society he is unemotional, unromantic, canny, and very independent; he cares little for the sort of figure he cuts in the world. He dresses to work the land and fight the weather, and his mind is on that only. Looking at the land, after six years of war, you knew what the farmer was thinking; you knew that he believed in himself and in this country. And you felt that this country was going to survive.

The farmer was not always so sure of himself, however, nor had he every encouragement to be. Many farmers, of course, were forward-looking and forward-moving even before the war, but there were others whom circumstances had driven into

comparative isolation, so that they seemed caught in the backwash of an older century. It appeared to them that the only thing they could trust was the land; it was something that did not change. Consequently they stuck to it and did not change either.

Most farmers took the new wartime life in their stride, but the men of this lost minority were resurrected by it. They had at last been given the opportunity to come out into the open, to farm expansively on scientific lines, to double and treble their output. They wanted nothing better than to be able to afford to do so—a privilege long denied them. As we mobilised for total war, therefore, they discovered that their skill was, after all, still one of our most powerful weapons, and they left the old world overnight and lost no time in catching up with the new.

The difference between the pre-war and wartime farmer was historical and significant. It could best be observed in the latter's new communal spirit, his enthusiasm for the sharing of experience, and his desire to learn through and with his neighbours. New crops and methods, continually changing with the sweep of war, brought farmers together everywhere to compare notes and exchange theories. They co-operated in every possible way—organising discussion groups, meetings, lectures, demonstrations,



BRUSHING UP ON THE PLOUGH. Ploughing has always been a skilled man's work; the tractor has introduced a new technique into it. County Committee demonstrations bring home the best methods to every farmer.

determined not only to pick one another's brains, but to spread the gospel of their experience among their neighbours.

"Neighbours' Day", for instance, became one of the most popular and direct methods of contact. A farmer, taking his prestige in his hands, would invite his neighbours to call on him, say, the following Sunday morning. They arrive, walk round his sheds and fields, observe, discuss, and ask questions. It may be something of an ordeal for the host; he knows that, if he has made mistakes, no sort of excuses can camouflage them now. If he has been particularly successful with his crops or livestock, then

his neighbours will learn by it, and his pride will have its day. And if anything has failed, someone will tell him why, and he, in turn, will benefit by the advice.

In a less direct but equally important way, discussion circles served the same purpose. Meeting together in pub., schoolroom, or farmhouse kitchen, countrymen spent many a long winter's evening holding inquests on the year's achievements, swapping theories and opinions, airing old feuds, and planning the next spring sowings. Such gatherings were a real tribute to the War Agricultural Committees and to the energy of their hardworked staffs. Many of these men attended

discussion groups three or four times a week, and this after a full day's work in the fields. These discussions were a new thing in village life. Attend one, and you would get a pretty good idea of the spirit among farmers.

Sitting round with thumbs in waistcoats, puffing at battered pipes, they are then at their most vocal. There are old men and young men, their faces polished by wind and rain, their hands as brown and gnarled as walnuts, all weighing their words with special care. There may be some present who have not met in the same room since boyhood, sworn enemies perhaps, and they will not refrain from taking a sly dig at each otherthough it is just as possible here they will make it up. Then there is the old farmer whose dialect is shrouded with archaic allusions, tags and formulæ; who knows the history of every field in the neighbourhood for generations back, what was grown there, when and by whom, why it thrived or why it failed, and says what he thinks of the damn-fool attempts of some of the vounger men. He comes in for a certain amount of leg-pulling; but everyone listens to him, for he is the land—not just any land, but this particular stretch of land folded in this particular valley which, like him, has moods, tricks and wisdom to be found nowhere else.

As these men talk, you find their phrases short, to the point, falling on the ear like proverbs or blank-verse quotations, exceedingly simple and memorable:

- " Never touch that field after Christmas."
- "Ground's too cold."
- "Cold as my grandmother."
- "One acre down here's worth three up North Common."
- "Must have good pasture close home, Bert.
  - I work mine one and one; mow it, then graze it."

- "Broadcast kale and you'll beat the wireworm,
  - that's what my father used to say."
- "I think with your father, Jack—they can follow a drilled row—they get lost when it's broadcast."
- "I sowed maize in my ten acre—the rooks took it—
  - I said, Go on, make a good job of it—and they did.

Then I sowed flax-it thrived."

They talk with new words, too, though delivered with the same sure sense of truth:

- "What d'you balance your mangolds with?"
- "Super and sulphate of ammonia."
- "Two hundredweight sulphate to four of super."
- "Lime and ammonia won't mix."
- "Any antidote for fly?"
- "Derri-dust."

And so on. Out of all this the farmers built up among themselves a sound practical relationship. They may have had to give away something in the process, some private piece of knowledge guarded jealously for years perhaps; but, for each one surrendered to the common pool, they picked up many that were new to them. The real significance of this type of discussion is that it was based on local experience, soil conditions, and personalities which vary from parish to parish and for which no outside educational effort could possibly cater so well.

Young Farmers' Clubs, too, had a farreaching effect upon farmers in general. For the older men are more readily influenced by their sons than they might be by strangers, and the development of Y.F.C.s throughout the country was responsible for the spreading of new technical ideas which went much further than the young farmers themselves. Y.F.C.s were started in this country over 20 years ago, but they had never flourished so well as during the war. They were as important socially as educationally, for they were open to everyone. Members' ages varied generally from 14 to 30, though this was no fixed rule (one of the staunchest supporters of a Cotswold Y.F.C. was an old cowman of 85). The clubs were democratic, and elected their own administrative committees on which young farmers, workers and land girls shared an equal responsibility.

The educational facilities offered the whole farming community had, in fact, never been more ambitious. Over a million and a half "Growmore" leaflets were distributed by the Ministry of Agriculture, with concise notes on every conceivable Wherever farmers congregated problem. you would find its experts plugging practical demonstrations of one sort and another. A practical demonstration, particularly if it is held on a neighbour's farm, means more to the farmer than any amount of literature or expert talk, no matter how knowledgeable. He is more impressed by the modest achievements of a neighbour than by the most sensational tales of a stranger's successes. And on the grounds of "Well, if old Tom can do it I reckon I can", is more likely to emulate his example.

You would find the farmer and the farm worker attending such demonstrations in a spirit of quiet, deliberate inquiry. Conscious that theirs was one of the most complex industries that exists, they were out to pick up anything that would add to their skill and technical scope. That is the main difference between the modern farm worker and the old-time labourer—his conscious pride in himself as a first-class technician. Not so many years ago he was the most illpaid and overworked individual in the country. He seldom earned more than 30s. a week, drew neither dole nor sick benefit, and got no holidays. Since the war he has begun to receive his due; his wages have risen to a more reasonable level, his present minimum of 70s. a week comparing with

48s. in 1941. He is paid overtime and has a week's holiday with pay; and he had already begun to enjoy State protection in sickness and unemployment for several years before the war. Moreover, the nation knows his real need for better living accommodation.

The growth of his trade unions has been responsible for winning him increasing benefits and a recognition in keeping with his extreme importance to the community. The national conscience, expressing itself in such constructive bodies as the Agricultural Wages Boards, had begun to see to it that he received a better and more just reward for his labours. This attempt to raise his standard of living is of the utmost importance to the future of agriculture. For a sense of absolute fatalism about his conditions had for years been developing in the worker's mind, so that he accepted them as the inevitable evils of his profession. The only protest many allowed themselves was the negative one of throwing up their jobs conpletely and moving away to the towns. This movement became so general that at the outbreak of war there were fewer skilled men on the land, relatively, than ever before. And of those remaining, 50,000 were absorbed by the armed forces within the first two years. With 6,000,000 additional acres to work and cultivate, the farmer was faced with a very grave labour shortage indeed. Although this shortage was never overcome, it was eased to some extent by auxiliary labour, by the return to the land of many thousands of townspeople.

The most important contribution to this movement was, of course, the one made by the Women's Land Army. This young, suntanned, green-sweatered, cord-breeched army of one-time shop girls, typists, mannequins, mill girls, hairdressers, parlourmaids, was throughout the war in the forefront of the battle. They figured in every ordeal and triumph wartime farming has had to offer. They filled the early gaps in manpower. They drove their ploughs on the winter

pastures of 1939; they were the spearhead tractor-drivers of countless tough reclamation jobs; they went through all the campaigns of winter and summer, struggling with storm and mud, milking, sowing, harvesting, threshing, living in wild unfamiliar parts of the country, among strangers and stranger ways, often completely cut off from the world in which they had been brought up. An army of girls, tackling a life which many a man would find exhausting, suffering from callouses, chilblains, and aching bones, but buoyed up all the time by an extraordinary curiosity and devotion for those tasks which seemed to be, somehow, so much more vital than the aimless jobs of city and factory to which so many had been accustomed.

The W.L.A. was set up some months before the war. The first thousand members went straight on to the land, though most recruits after that received preliminary training for their particular jobs. But the land girl throve on direct experience. Her worth to her employer may be judged from the labour conditions guaranteed her. girl was engaged by contract which guaranteed her regular employment throughout the year, a minimum of one week's holiday with pay and no deductions for sickness or wet weather. Those under 18 received a minimum weekly wage of 18s. over and above their keep, and those over 18 got a minimum of 22s. 6d. They could always be sure of this much in their pockets, and any overtime increased it. Such wartime conditions were the legal obligation of the employer; what is more important, they constituted a reasonable precedent which may well influence the future conditions of agricultural labour, both male and female.

The W.L.A. officers and County Committees, assisted by 4,000 voluntary local helpers, dealt with the placing, billeting, equipping and welfare of the girls, this welfare work including the organisation of clubs, training, and proficiency tests.

The coming of the land girl, in the early days, was a source of some perplexity to the farmer. To his wife also. Neither was quite sure how it would work out. Compared with the ruddy, strong-limbed village lasses, these paler, streamlined, town-bred girls seemed much too fragile for the rigours of outdoor work. But farmers' wives and country women generally, in spite of the additional burdens placed upon them by war, gave the girls a great welcome, housing and looking after them, and easing for them the unfamiliarity of their surroundings. And the girls, fragile as they may have seemed, soon surprised everyone, not only by their fresh enthusiasm but by their almost obstinate fanaticism, which refused to allow any job, mucky or otherwise, to get the better of them. There was nothing they would not attempt. Some were particularly suited to the new life, anyway: Lancashire girls, for instance, accustomed as they were to an industrial environment, adapted themselves readily to the subtletics of farm mechanisation. As a Wiltshire farmer said of another type of girl: "Of course I was a bit doubtful at first, especially when I found I was let in for a couple of actresses off the stage. But let me say this—if actresses can make such good land girls, let me have actresses again!"

Apart from their contribution to manpower these 90,000 land girls formed a very strong bridge between town and country. Many married farmers and farm workers, and settled down altogether to the new life, while hundreds of others were taking up agriculture as a serious study and intended to make a permanent career of it.

Many other types of auxiliary labour beside the W.L.A. were brought in to fill up the gaps, particularly for the heavier work of ditch-digging, bush-clearing and so on. They were strange types too, some of them—men who, but for the war, might never have known what a British farm looked like—Italian prisoners of war and aliens and refugees from all parts of Europe.

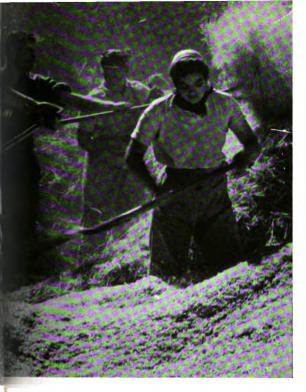








Digitized by Google





Yet, in spite of all these, there were certain times of the year, still, when the labour situation remained exceedingly critical. It is easier to sow a crop than to gather it. Yet farmers continued to sow thousands of additional acres each year in the faith that, once sown, the means would be found to harvest them. They had no idea at all where those means would be found, but in one way and another they were found. In the first years, for instance, soldiers based in the heart of the country came to the aid of farmers in whole battalions.

Later, of course, the armed forces had other business on hand and much less of this kind of help was available to the farmer. But other armies took their place, armies of unskilled but enthusiastic civilians. as in olden times of common peril, when the need for action would be felt instinctively by the whole community, so in this war, men, women and children in their thousands came out from the towns and villages in time to help get in the harvests. Each year the sowings were greater, the harvests heavier than the last. Each year it seemed inevitable that some would be left to rot. Yet, as they ripened and stood over the countryside, heavy, golden and ungathered, an indefinable sense of urgency seemed to communicate itself to the townsman, so that at the last moment he was always there to lend his strength to the farmer.

Schoolchildren gave great help everywhere. Those from the country were used to seasonal work on the land. But great numbers came from town and city too, from public and council schools alike—boys and girls to whom the produce of the farm had never been much more than items on a shopping list. It was a great adventure for

LAND ARMY. They came from shops, offices, beauty-parlours, dancing schools. They went wherever they were needed, did any job that would replace a man. They have known six winters and six summers on the land, have gathered six wartime harvests.



POTATO RACE. In spare time and holidays they have done good work, sowing, reaping, picking up pocket-money in their stride. Farming, for them, has been a worth-while game.

them; they came in loud, excited gangs, bursting with curiosity for the new world. They lived under canvas or in specially requisitioned premises, and worked out their holidays among the fields. They helped with every kind of job: the boys potato-planting and lifting, tractor-driving, harvesting, flaxpulling, root-hoeing and singling; the girls potato-planting and lifting too, weeding, peapicking, fruit-picking, flax-pulling-their neat swift fingers unrivalled at such labour. In 1942 the boys and girls of Britain worked nearly 10,000,000 hours in the fields. They did much more in 1943, and arrangements were made for them all over the country to meet the still larger harvests to come. Surrounded by the clamour of war, they appreciated very well the reality of what they were doing; they knew their work was important and, of course, they were being paid for it.

As for the adults—village women, like their children, are still close to the tradition of communal farm work. The days are not so far distant when they were expected, as a matter of course, to join their menfolk in the fields at certain times of the year. True, the custom had begun to die out, at least till war came along. The women went back to the land; Women's Institutes organised all kinds of part-time labour for them, and members volunteered for service whenever their housework would allow them. Many who could spare a couple of days a week volunteered as relief milkers to give cowmen and land girls an occasional day off. Others. organised in the manner of midwives, helped to attend the calving of cattle and so to relieve the farmer of yet another of his anxieties.

But, during the critical weeks from June to October, there was never enough labour either in the yards or the villages to cope with the vastly increased cultivations. Labour was needed throughout all those weeks, right up to the harvest. If, during the war years, volunteers had not come to his assistance, not even the farmer could tell you what setbacks might have occurred. The movement which brought the town workers to the fields is a significant one. It proves that the hereditary link with the land is still unbroken, even among the most urbanised communities. Perhaps too that sense of food, which always becomes more acute in war time, persuaded some to look to the fields to see how things were going. Anyway, Land Clubs for volunteer labour began to spring up in towns and cities all over Britain. Factory hands sent deputations to the W.A.E.C.s, offering their spare time and demanding to be put to work.

Civil servants, bank clerks, solicitors, typists, shop girls, employees and besses alike, joined with them. Harvesting, suddenly, became everybody's business.

The Agricultural Departments and the Ministry of Labour threw themselves whole-heartedly into the task of organising this vast and willing force. Camps and hostels were erected and placed strategically throughout the arable districts. Village halls and schools were requisitioned. They were fully equipped with bunks, food kitchens, and maintenance staffs. Then they were thrown open to everyone: here you could come and spend your holidays; you were promised plenty of fresh air, toil and sweat without the tears, a temporary land job of first-class importance, and a round payment of a shilling an hour as well—age and experience no object.

To these camps the workers came. They

IN THE SUN-RIPE PEA-FIELD, they work and gossip—village women, with their children, by age-old custom the farmer's seasonal help.





HOLIDAY TASK. City workers came in their thousands; some tore off their shirts, and all worked with immense gusto. The harvest had become everybody's business.

came in their thousands; they forgot Blackpool and Clacton; they forgot coal-dust, oil-waste, buzzing lathes, blackout-boards; they tore off their shirts, took a good swig of country air, and plunged into the corn and cabbage as if for a salt-sea bathe. Many were awkward, stiff-jointed with their tools, but they worked with immense gusto. And they got a smell of the land; they saw what a crop looked like, what it was like to handle, and what labour went into the raising of it. They knew the satisfaction of a good day in the harvest fields, with dust and chaff stuck to your sweating arms, hours in the hot sun and the exhilarating thirst it gives you, and best of all the solid appetite you carry away with you in the evening, the job well done, the corn ready stacked in the barn.

Perhaps they were never on the job longer than a week at a time; but when they left, others took their places throughout the summer. Thousands of these helpers handled the bumper harvests of 1943 and 1944.

When at last they got back to their desks, counters and work-benches, stiff as they were, blistered, burnt red with the sun, their food tasted better to them, the countryside had more significance, and the farmer's life—his problems and the tasks with which he is faced—seemed more real to them, less of a fable, because they had shared it with him.

Surely the gulf that has hitherto existed between the two communities, town and country, could be bridged in no better way than this?

#### WAR RECORD: A SUMMING UP

LAND: Since 1939 6,500,000 new acres have been ploughed up.

LABOUR: The land has lost 98,000 skilled men. But 117,000 women have replaced them.

LIVESTOCK: Between 1939 and 1944 milking cows increased by 300,000; other cattle by 400,000. But there were 6,300,000 less sheep, 2,500,000 less pigs, 19,200,000

less poultry.

HARVESTS:		1934-38 average Tons	1943-44 Tons	Increase
	WHEAT	 1,651,000	3,449,000	109
	BARLEY	 765,000	1,641,000	115
	OATS	 1,940,000	3,059,000	58
	POTATOES	 4,873.000	9,822,000	102
	SUGAR BEET	 2,741,000	3,760,000	37
	VEGETABLES	 2,384,000	3,197,000	34
	FRUIT	 455,000	705,000	55

NOTE.—The figures above are drawn from "Statistics Relating to the War Effort of the United Kingdom", a Government White Paper published in November 1944.









THE SCHOOLS IN WARTIME





"THE SCHOOLS IN WARTIME" is both an account and a tribute.

It tells how Britain's State educational system has adapted itself to war-time conditions, and how these conditions have given rise to new methods and new hopes for education. It is a tribute to those who organised the Evacuation Scheme, to the hospitality of our country folk, to the devotion of our teachers, and above all to youth's courage and resolution.

### LIST OF CONTENTS

				P	AGE
Foreword					3
The Great	Migration	·			4
The Town	Child in t	he Co	untry		8
The Schoo	l in Camp				16
The Schoo	ls Under l	Fire			21
Postscript					26

ISSUED BY THE MINISTRY OF INFORMATION ON BEHALF OF THE BOARD OF EDUCATION
PUBLISHED BY HIS MAJESTY'S STATIONERY OFFICE

Available directly at any of the following addresses: York House, Kingsway, London, W.C.2; 120 George Street, Edinburgh 2; 39-41 King Street, Manchester 2; 1 St. Andrew's Crescent, Cardiff; 80 Chichester Street, Belfast; or through any bookseller ... PRICE 6d. net or 20s. for 50 copies.

FIRST PUBLISHED 1941. CROWN COPYRIGHT RESERVED

S.O. Code No. 70-376.

Printed by The Whitefriars Press Ltd., London and Tonbridge

Digitized by Google

### FORE WORD

#### BY THE

#### PRESIDENT OF THE BOARD OF EDUCATION

In the pages that follow will be found a series of short sketches depicting different aspects of the life and work of the schools under the stress and strain of war. They are sketches only: they do not pretend to give a comprehensive record of the educational history of these present days. When that history comes to be written in detail we shall, no doubt, find much to regret, but not a little also that gives cause for satisfaction and even for pride.

The quality of our education and training, as well as the qualities of our British character, have been proved in fighting on land and sea and in the air and, no less, in the streets and homes of our bombed cities. Day by day, too, in the schools the courage and discipline of children and teachers alike have been helping to maintain the steadiness of our national life.

That Education should suffer its war wounds has, of course, been inevitable; but despite all difficulties, thanks to the energies of the Local Education Authorities and of their staffs, both administrative and teaching, the service has been kept going to an extent not always, perhaps, sufficiently realised. There has been disturbance and dislocation, but the schools are carrying on.

Herwald Ramsbotham.

## THE GREAT MIGRATION

n planning measures to defeat the menace of air attack, it was early recognised that a main line of defence would be dispersal, and, in particular, the removal of school-children from the congested and more dangerous areas to safer areas. This was an operation for which previous experience offered no precedent and the far-reaching effects of which have yet to be measured.

In the summer of 1938 a Committee under the Chairmanship of Sir John Anderson, now Lord President of the Council, examined the possibilities of evacuation and, on the basis of their Report, a plan was hastily improvised for the removal of London children at the time of the Munich Crisis in September of that year. In the event this plan was not put to the test, and the breathing space which followed was used to prepare a more complete scheme covering a number of urban areas—the Government Evacuation Scheme drawn up by the Ministry of Health assisted by officers seconded from the Board of Education.

For the purpose of this scheme the country was scheduled into Evacuation, Neutral and Reception areas. The Evacuation areas were those from which certain "priority" classes—in the main school-children unaccompanied by their parents and mothers with children under five—were to be given the opportunity of transfer to safer areas in the event of emergency. Reception areas were those assigned for their reception. Neutral areas, as their name implies, were to be neither senders nor receivers.

On September 1st, 1939—just two days before the actual outbreak of war—the button was pressed and the scheme put into action. It was an immense undertaking involving the transport of  $1\frac{1}{2}$  million people, of whom rather more than 750,000 were children travelling in school parties with their teachers and voluntary helpers. The whole of this vast migration was effected smoothly and efficiently in two or three days—a truly magnificent effort on the part of the railway and road transport systems.

Working against time and the possibility of air attack at any moment, it was not possible to secure that the school parties all reached destinations where suitable, or in some cases even sufficient, school accommodation was available. This was the case more particularly with the London and Greater London groups, covering some half of the children evacuated, for whom the transport arrangements were necessarily very complicated. As a result, some Secondary and Junior Technical Schools found themselves decanted in remote places out of reach of any local school of similar type; while other schools found themselves scattered over a wide area in a number of villages. In holiday resorts, again, billeting accommodation was ample but school accommodation sufficient only for the normal small resident population.

There were faint hearts in plenty who, seeing all the difficulties that arose at the outset, said that Education was the first casualty of the war, and that the system built up over many generations had in a

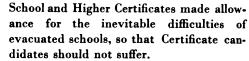
# The Great Migration



moment almost been reduced to hopeless Such, fortunately, was not the attitude of the teachers, inspectors and education officers. Working night and day, they set themselves at once to reduce what was colourfully called "chaos" to order. Many Education Offices were never closed during those September weeks; adjustments were made, schools were moved. children re-billeted and reorganisations arranged. Books and equipment were supplied, parish halls, large houses, buildings of all sorts were pressed into service to supplement the schools, and means of occupation and recreation were provided. The result of unremitting labour and ready improvisation was that by Christmas, 1939, the great majority of the children evacuated, together with the local children in the Reception areas, were receiving full-time education, and arrangements were well in hand to provide education full-time for the remainder early in the following spring term.

The Secondary Schools presented particu-

larly awkward problems. The proportion of their pupils evacuated was larger than in the case of Elementary Schools, and they were often badly placed from the point of view of the necessary educational facilities. Means were, however, devised, by extensive re-billeting and by bringing into use temporary premises, to provide reasonably for most subjects of the curriculum. Special care was taken to see that School Certificate Forms had something tolerably approaching their normal timetable, and the examining bodies for the



Arrangements were also made for the examinations for the award of Special Places, so that children should not be deprived, by the disturbance of war, of their chances of going on to a Secondary School.

#### EVACUATION IS JUSTIFIED

All this work was done-and then nothing happened, in the sense that air raids failed to develop on the intensive scale that had been expected. Parents soon began to wonder whether this separation from their children was really necessary, and the tug of family affection combined perhaps with some home-sickness among the children led first to a trickle and then to a stream home-The trek home started, indeed, almost at once and by the end of the year the number of children remaining in the Reception areas had been reduced to 472,000, or 63 per cent. of those who originally went out. Thereafter the flow back tended to slow down, and by mid-April, 1940, the number of evacuee children still out in the country was round about 300,000.

The situation was soon to change. The invasion of the Low Countries and the enemy occupation of the French Channel Ports in the early summer of 1940 brought air attack nearer and, with it, the threat of invasion. It was necessary to modify and extend the scope of the evacuation scheme. Places on the east and south-east coasts hitherto used as Reception areas could no longer be regarded as suitable for that purpose, and in June and July evacuee children billeted there were removed further inland. Some coast towns became Evacuation areas and an effort was made to stimulate evacua-



### The Great Migration

tion afresh from the London area, the Medway towns and a number of coastal districts.

The intensification of air warfare and the indiscriminate bombing of the civilian population which began with large-scale attacks on the London area in September, 1940, made it necessary to speed up, as well as broaden the basis of evacuation so as to remove as large a proportion as possible of the non-effective population, particularly school-children, from areas made the targets of enemy attack. As a result many thousands of children have now been removed to safer areas, and in December last the total number of children so settled in the Reception areas had risen to over 620,000.

What have been the educational effects of transplanting this very large number of town children into entirely fresh surroundings, mainly rural, so vastly different from those to which they were accustomed? Some of these effects are dealt with in the pages that follow, but generally the results

may be summarised in this extract from a report made by the Chief Inspector for Elementary Schools of the Board of Education:—

"The general picture of education in Reception areas is encouraging rather than discouraging. . . . There can be no doubt that many children's lives have been greatly enriched by their removal from large towns and, in the case of children from the worst homes, the conditions that make for sound education have been substantially improved. . . . The new interests and the wider basis of first-hand experience which the children have been getting might, on any broad view of education, be felt to compensate for some falling-off in formal attainments. . . . In general teachers have been forced to improvise, to depend less on school apparatus and to see more value in children's out-of-school activities and ex-This at its best has brought into school work a fresh reality and humanity."





## THE TOWN CHILD IN THE COUNTRY

any must have seen the parties of school-children assembling at the stations in the early days of evacuation, generally in good fettle—rather excited, indeed, by the novelty of a strange adventure, but some perhaps a little subdued by this first leaving home and separation from their parents.

Once aboard and settled down to the journey, the tedium beguiled by the delights

of a picnic meal, many at least among the older ones must have wondered what kind of place they were going to—whether to seaside, country town or village—and in what kind of home they would find themselves by the evening.

Human nature being what it is, there were bound to be some misfits, necessitating some re-sorting of both children and billets.

### The Town Child in the Country

In the main, the children came from the poorer and more congested quarters of our large cities, and the physical condition and the habits of some of them, though the number was greatly exaggerated in the more lurid reports, were undoubtedly a shock and a trial to many a country cottager accustomed to scrupulous cleanliness. Generally, however, those children who were sent to country districts and were allowed by their parents sufficient time to settle down in their new foster-homes, adapted themselves readily to the ways of their hosts and quickly fell in with the conditions of country life. This was true of boys and girls of all ages: it was the adult evacuees who somehow could not get used to the country and so often felt the quiet and strangeness of village life intolerable.

For the younger children from the towns the change to the country has brought to life the familiar school pictures. The cows, pigs and lambs sprinkled over the pages of the infant readers, so long entirely static, have now moved and displayed a neversuspected power. "They're live, they can walk," said a child of five who saw a sheep grazing for the first time; "I thought they were only pictures, but they're really true."

Little fear of animals has been noticed, but rather blank amazement that the sentences read so earnestly word by word in the classroom really have a marvellous meaning. Then, too, the fruit and vegetables hitherto seen on barrows and in shop windows have been found on trees and bushes, in gardens and fields. "But they're in boxes where I live"; "Ours grow in tins; they aren't dirty like that," have been frequent comments; while the discovery that milk does not begin its existence inside

a bottle has given great surprise. Every infant has, in fact, had the thrill of being a genuine explorer.

Indeed, to all children, irrespective of age or character, life in the country has presented many novelties. Most were impressed by the greater quietness as compared with the din and clatter of the streets at home. To some, this quiet was so strange as to be a source of some alarm, until it was realised that it did not mean that everything had stopped, or that something was up. Others noticed the greater distance from school: school was no longer just round the next corner. A real walk to school, possibly taking dinner with you, was something quite new.

But the greatest novelties were to be found upon the farms, where the various activities have been a constant source of interest and delight. In return for these the children are generally found to be entirely willing to forego the lure of the shop window, the rush of traffic, the inevitable fish and chips of their home towns. Even the cinema habit-at least twice weekly with the change of programme—has lost its enslaving grip; although, since films are shown on some evenings each week in many villages, the evacuee child may be taken to them occasionally, as is the country-bred child, for a special treat. The habit of earlyto-bed which still survives in the country is being learned, with good results on mind and body.

It is true to say that practically all the children have improved in physique, general health, poise and bearing during their stay in the country.

Apart from clean, fresh air they have had the benefit not only of more fresh vegetables

and fruit, but often of a change of diet. This has not perhaps always been welcome at first, but has come to be appreciated later and proved most beneficial. Increases in weight and height, rosier cheeks, greater physical strength, have been not mere fiction but sober fact. One London parent, on arrival in the Reception area on a visit, did not recognise her own daughter after five months' absence, and had to be convinced of her identity by the teacher.

#### **NEW CONTACTS . . . NEW INTERESTS**

But the advantages are by no means all simply physical. The experience of living for the first time away from home has given to many children a new poise and selfreliance, and more thoughtfulness for others. Contact with a different way of life and rubbing shoulders with country children-and for that matter with children from different kinds of homes from other Evacuation areas -have done much to broaden the outlook of those whose lives had been confined to a few streets. Learning to live in someone else's house, to think of others, to entertain oneself instead of being entertained, to realise the worth of those who labour to supply much of the nation's food-all these are elements of education which could hardly have come to most of these children but for evacuation.

They have been forced to find new amusements and have found them readily and naturally in the country. The games of the town streets have been replaced by the interests of the countryside. In town, amusement has often been sought from the old game of "knocking down ginger," throwing stones at empty cans, roller skating on the pavements, hopscotch and many other occupations which seem so often to have a nuisance rather than an amusement value! But in the country children get fun from very different things-fishing, rambling, cross-country running-but especially from helping in the many and varied jobs on the farm or in the garden. In their spare time the children have learned to feed the poultry, to keep the runs and houses clean and to do this or that in garden or allot-They seem particularly to have taken to looking after animals-calves and pigs-and many have become expert milkers. Boys have often developed into experienced helpers on the land, learning how to use their tools and to guide simple machinery with practised skill; while some of the girls have become quite proficient milkmaids and dairymaids.

Where the same games are played in town and country alike, such as football or cricket, the fine points followed in procedure are generally those of country custom. Observers of the manœuvres of mixed groups of town and country children in playground or on village green have sometimes remarked: "The country child has won again," meaning that it has been the country children who have called the tune and the town children who have followed it. Rarely has the country child adopted the manners, customs or speech of the town visitor. On the contrary, the town child has been most eager to imitate those of the country, with the result that, after a time, the evacuees are scarcely distinguishable from the natives, their conversation, both in choice of words and in pronunciation, developing a local flavour. During the first few days of evacuation some damage was done to property and to crops by the town

### The Town Child in the Country

children, but reasonable explanations as to what care should be exercised and why and, more important perhaps, the example of local children, have changed the attitude of the visitors from destructiveness to protection. They have, in fact, become good country folk themselves.

A rather special problem presented itself in Wales. The Evacuation Scheme did not contemplate the removal of Welsh people or children from their own homes or schools: their task has been to act as foster-parents and hosts to large numbers of children from English industrial or coastal towns, and generously have they responded to the demands made upon them. The children evacuated from England to Wales, particularly rural Wales, had not only, as else-

where, to adapt themselves to quite new surroundings: they were also faced with the problem of settling down among a different people speaking a different language.

There were some in Wales who were apprehensive about the possible effect of the presence of large numbers of English children upon the language and traditions of those districts which were still entirely or mainly Welsh. Happily the prophets of woe proved false. The people of north and mid-Wales showed that they were made of sturdier stuff than some guardians of their culture had imagined. They took the simple and commonsense view that the young evacuees would want to speak Welsh and, without being aware of it, proved

Country Welcome



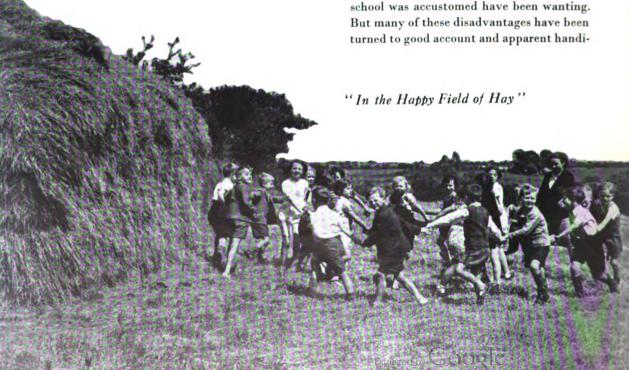
themselves to be uncommonly good exponents of the direct method of teaching a foreign language.

In many districts the schools helped. Arrangements were made between the visiting and home teachers to interchange classes for a period a day. The home teacher then took the evacuees in Welsh and was thus able to organise and co-ordinate what was being picked up in the home and the street. In this way the evacuees have gradually ceased to be strangers and large numbers of them have by now learnt enough Welsh to understand almost everything that is said to them, and to take part in the talk round the fireside and in the wider activities of the neighbourhood. They have begun in the real sense to feel "at home."

There were, of course, equally doubts on the other side as to the effects on the speech of English children of continued residence in Welsh districts. But any apprehensions on this score have in the event proved to have only slight foundation. The children themselves solved the problem. Knowing nothing of the academic difficulties of acquiring a foreign language, they-or at least a very large number of them-began to learn Welsh because it was the obvious thing to do, and the quality of their English speech proved to be such that the influence upon it of residence in Wales is not likely to harm it. They have lost nothing of their national identity: they meet their own teachers every day and, through them, are kept in touch with their homes and with what is going on in their home towns in England.

#### LEARNING FROM THE LAND

On the purely educational side, for the children in the Reception areas, there have been both losses and gains. There have, of course, been difficulties of school accommodation, and facilities to which the town school was accustomed have been wanting. But many of these disadvantages have been turned to good account and apparent handi-



### The Town Child in the Country

caps have proved themselves opportunities for a break-away from old routine. All the materials for nature study and geography have been found just outside the door: arithmetic has gained fresh interest from actual problems of the management of money; and letter-writing, no longer a rather artificial exercise, has had a meaning and a purpose. The children have had to do much for themselves and they have developed self-reliance and the power of independent effort.

The gains have not been solely to the town child. The children already living in the country have benefited in many ways from contact with their town visitors. So many questions have had to be answered, so many explanations given that the slower and more inarticulate residents of the countryside have had to make greater efforts to speak with lucidity, in order to impart their own instinctive knowledge and satisfy the curiosity of the newcomers. their surroundings afresh through the eyes of their visitors, they have acquired a new awareness of the beauties that surround them. The country has become a wonderland which invites further exploration and closer investigation.

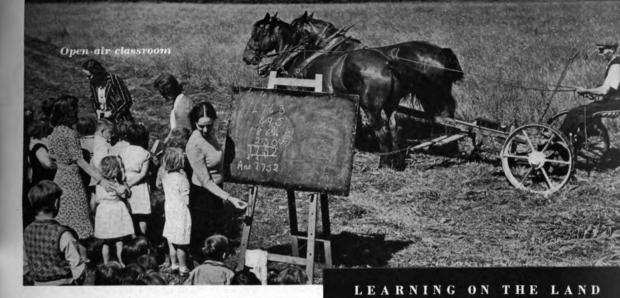
Although rural schools had previously made use of "out-of-doors" material, the presence of so many town children in the country has given new value and fresh impetus to outdoor studies. Extensive regional surveys have been made to give a comprehensive and clear account of the neighbourhood to the evacuees. Visits, some of which might not have been paid without the incentive of educating the strangers, have been made to agricultural shows, farmers' marts, reservoirs, water-

falls, quarries, and places of historical interest. Folk songs and local sayings and peculiar customs, both those in abeyance and those still honoured, all have come under review with benefit to natives and visitors alike.

It may not be easy to generalise on the influence that the town children's experiences will have on their future lives; or to say how many of those who have expressed a desire to live and work permanently in the country will in fact do so. It is, however, safe to assume that they will appreciate the countryside and its inhabitants in a way which would never have been possible before. Many who have fallen under its spell and found something of its charm, have acquired a new respect for the country which they will observe when they revisit it -as many will. They will have realised that skill and craftsmanship in some of their best aspects are to be found there, with the village smith, the shepherd, the ploughman, and indeed all who serve the soil. If also they have learned to value such things as wholesome food, sufficient sleep, regard for the property of others, tolerance of others' views and the ability to fill their free time from their own resources—then they will have gone far to acquiring the means of living a healthy and happy life.

Such lessons are not to be learned only from school. In this account of some of the ways in which town children have gained by their stay in the country the part played by the homes of the countryside deserves record and recognition. Many thousands of children will have cause to remember with gratitude the welcome, the kindness and the care they met with from their foster-parents in all parts of rural England and Wales.









## THE SCHOOL IN CAMP

Lake the acquaintance of a newcomer to the public system of Educationthe Camp Boarding School. Camps in themselves, as part of our educational provision, are, of course, no innovation: before the war there were some 20 permanent Camps conducted by Local Education Authorities. About half of these were used as holiday camps for under-nourished or weakly children needing a holiday and likely to benefit from a spell of life in the country. The remainder were used as Camp Schools for groups of normal children drawn from town schools and enabling them to carry on their school work for short periods in rural surroundings. Generally, however, these Camps could not be used during the winter months and the period of stay seldom exceeded a fortnight. The new Camp Boarding School has no such limitations: the children settled in them are receiving continuous education throughout the year.

These Camps—31 in number—have been brought into being by the Camps Act, 1939, which provided for the construction by the National Camps Corporation of camps of a permanent character, financed by H.M. Government. The intention of this measure was to provide Camps which could be used in peace-time as school Camps and in the event of war for evacuation purposes.

Actually, when war broke out the Camps had not been completed, but the work was pushed forward and early in 1940 a number were ready to be placed at the disposal of Local Authorities for use as boarding schools for Secondary, Central or Senior Schools moved out from the more vulnerable areas. As the incidence of the infectious diseases of childhood is relatively very high amongst children under 11 years of age, it was decided to limit the camps to older children. At the present time one Camp is occupied by an Orphanage and 29 by schools main-



### The School in Camp

tained by Local Education Authorities, two being Secondary Schools, one a school for physically defective children, and the others Senior or Central Schools. The total number of children so housed is approximately 6.250.

The Camps are all in rural areas, standing on large sites of 20-40 acres, carefully selected with regard to drainage and water supply. The buildings, constructed of cedar wood on concrete foundations and roofed with shingles, have a pleasing appearance. They generally include four classrooms; two other rooms to be used as practical rooms; a hall, which can also be used for teaching purposes, complete with stage; a large dining-room, together with a kitchen, staff rooms, a store and, not least important, a tuck shop. As a rule five dormitories are provided, each equipped with two-tier iron bedsteads, with a small room for a teacher at each end. A lavatory block with baths, showers and a drying-room; a hospital block for about seven patients and a nurse; quarters for the Camp School staff and selfcontained flats for the Headmaster and the Camp Manager, complete with equipment. Central heating by radiators and electric lighting make it possible to use the Camps continuously throughout the year.

The National Camps Corporation undertake to maintain the site and the buildings in good order and to provide what may be described as "hotel facilities," including food and the necessary domestic staff, in return for a weekly charge per child which is recovered by the Authorities from the Ministry of Health as Evacuation expenditure. The Local Education Authority on its side is responsible for the provision and maintenance of school furniture, the equipment, books and stationery, and also for paying the teachers' salaries.

It is early days yet to attempt to assess the merits or the possibilities of these new boarding schools: none of them has been in existence for more than a comparatively few months, but some account of the life and activities of one or two will serve to indicate the values that are emerging.

Take, first, a Selective Central School for some 200 girls moved from a busy London suburban area and planted down amid the quiet beauty of woods which crown a summit of what are perhaps the loveliest hills in the Home Counties. The nearest station is four miles away and the village, of no great size, is upward of two miles away.



There is no question about it—this is really in the country and means a completely new life. Here is the daily timetable:—

7 a.m.	Warning bell.
7.15	Rising bell. Washing, dressing, un- covering of beds.
8	"Servers" (on a rota system) go to Dining Hall to help with preparations for breakfast.
8.15	Breakfast.
8.35-8.55	Making of beds, tidying of Dormitories. (Treatment of girls with "minor ailments" in the Camp Hospital.)
9.15 a.m	Morning School.
12.15 p.m.	
12.15	"Servers" go to Dining Hall to set the tables.
12.30	Mid-day meal.
2-4	Free time spent out of doors whenever possible—walks, organised games and
	other outdoor activities. Attending to "individual" gardens.
4	"Servers" go to the Dining Hall to set
	the tables for tea.
4.15	Tea.
5-7	Afternoon school.
7	Supper.

After supper the younger girls go to bed: the older ones have free time for games, knitting, reading and other occupations until 8.30.

Every afternoon is left free between dinner and tea so that it can be spent out of doors. Gardening, a new subject for these girls, has become a living and urgent

### Dressmakers



interest. On two large allotments they have helped to grow potatoes, tomatoes, cucumbers, beans and other vegetables, while a large number of the girls have individual gardens in which they grow radishes and lettuces. In summer, much of the nature study has been taken out of doors, and interesting collections of wild flowers have been made, with competitions for "first finds" of flowers and bird songs. Nature study goes on, too, in the winter with a study of bare trees and fungi, and country rambles are part of the regular routine.

Physical training and games are taken in the open whenever possible. The cookery instruction, too, can be made to play its part in the life of the Camp. Sometimes the food which the girls cook can be fitted into the Camp menus; or they can help to prepare for special occasions, such as Christmas and New Year festivities, by making "party dishes"—jellies and cocoanut ice, at once satisfying and decorative.

But the possibilities offered by residential conditions are being used to the full. Outof-school activities have been developed, with study circles for a large number of girls, and a choir with over 100 members. Dramatic work has been greatly stimulated with three classes a week for the study and production of plays. During the Christmas holidays, the four "Houses" into which the school is divided arranged games and competitions, and House concerts were given by the girls for the entertainment of parents and other visitors. In this way talent hitherto often unsuspected either by the staff or by the possessors themselves is being revealed and given scope.

The captain of a minesweeper saw a picture of the girls knitting in a daily paper and got into touch with the school, which has adopted his ship and sends to it parcels of knitted articles and magazines. Knitted blankets, clothes and money are also sent to

evacuees in a neighbouring village and to a mission in the east end of London. There was the problem of acquiring wool for the knitting. This was partly solved by the sale to a local farmer of bushels of acorns collected by the girls. A number of girls also helped the farmers with the harvesting of oats during the summer holidays.

#### CREATING A COMMUNITY

One of the most valuable features of this residential life is the general training which is made possible. The girls are called upon to shoulder personal responsibilities which usually fall on their mothers. They have to manage their own money, out of which they pay for their hair to be cut or their shoes to be mended, and they apportion their contributions to National Savings and other causes. They are learning, and find it a pleasure, to wash and iron their own underwear in their free time, and get repairs done in a weekly mending class. The older girls "mother" the younger ones and help to create an atmosphere of family life.

The school has to some extent taken its place in the life of the local community. The girls helped with the decoration of the church for a harvest festival and just before Christmas were allowed to perform in the church a nativity play produced by a member of the school staff, in which 87 girls took part.

Once a month there is a parents' visiting Sunday, when the girls act as hostesses and the school staff are at hand for discussions with the parents. A special Christmas lunch was arranged last Christmas, to which 240 parents came, and the Chairman, appointed by the parents, spoke with the greatest appreciation of the work and life of the Camp and strongly advised all to leave their children there for the duration of the war.

The improvement in health is remarkable.



Cobbler

The girls have become acclimatised to the rigours of country life; they are alert, enterprising and eager to take responsibility. Weeks pass and the "hospital" stands empty. Long nights of sleep in peaceful surroundings, regular hours, carefully planned diet, open-air conditions, plenty of interests and the unfailing care and kindness of the staff have produced—as they must produce—health and happiness.

The boys, too, are making a good job of this Camp School life. Another Camp houses a Senior Elementary School of some 200 boys from an industrial town. They were drawn from a number of different schools and many of them were entirely unknown to each other and to the staff of their new school. Here, then, was a prob-

lem of creating a real community under conditions strange to all of them. Neither the headmaster nor his staff had any previous experience of this type of work, but their lack of experience has been more than compensated for by enthusiasm, initiative and enterprise.

Naturally, not every boy easily accustomed himself to this new mode of life and a number of them returned home. The majority, however, quickly settled down and the school now is well on the way to becoming a corporate whole.

The school opened in July, 1940, and no doubt the summer weather influenced the staff to explore the possibilities of using the surroundings of the Camp as a basis for their school work. It was not long before a good deal of outdoor work was being carried out in such subjects as geography, nature study and sketching, while the development of a garden of about one acre has not only provided interesting and healthful occupation, but has brought new meaning to science and practical arithmetic.

For games and exercise there is a small

#### Laundress



gymnasium and ample outdoor facilities for cricket and football. Contacts have been made with local schools, which have helped to break down any sense of isolation which the boys might otherwise have felt. Rambles and cycle rides on Saturdays carry the boys out into the country and introduce them to wide stretches of the countryside.

This Camp is fortunate in having a stream flowing through the grounds. With the assistance of a generous benefactor, who helped considerably with materials and labour, a swimming pool 36 ft. by 18 ft. has been made by the efforts of the staff and boys.

One of the problems of school camp life has been how to fill in the long winter evenings. At this school the problem has been thoroughly tackled. Making full use of all the indoor space available, activities of many kinds with something to appeal to everyone were organised. There is a reading-room, for which books are sent out by the home town Library Committee, an Art Club, Hobbies Club, Chess and Draughts Club, Dramatic Club, Scout troop and also sewing and boot-repairing classes. school has also been lent two film projectors, one for sound and one for silent films, making it possible to give a cinema show each week. A film of about 1,000 ft. in length has been made to record various aspects of Camp School life and is being used for propaganda purposes in the home town.

Once again there is the same story of improved health and improved physique due to good food, regular hours and life in the open air. There is no doubt that the children who are fortunate enough to be spending a part of their school life in one of these Camp Schools are having a most valuable experience. These schools are giving education in its best form; they are providing a satisfying way of life.

20





## THE SCHOOLS UNDER FIRE

Lun, rabbits, run," calls the teacher, and instantly some 20 or 30 little people disappear, leaving no signs of their presence but an odd foot or two sticking out from beneath the desks. No, it is not a new game for the infants' school: at least, it may be a game to the children, but it is something more than that—it is practice in taking cover against a sudden air raid.

In most schools gas-mask and shelter drills form a regular feature of school life, to train the children to meet a possible emergency without hurry or confusion. The Head Teacher gives the signal and the classes, accompanied by their teachers, file out into the corridors and make their way to the trenches, each taking its prescribed route. A last look round for any stragglers and then, when all are assembled below ground, out comes the watch—"Three minutes," says the Head: "we can do better than that."

### The Schools

When day raids came the value of these drills was amply proved. The siren took the place of the Head Teacher's signal: otherwise, they were conducted exactly as before, the children sometimes being hardly conscious that this was the "real thing" and not just another practice.

To tell the truth, the younger children are inclined to welcome change and movement, and the "Sirens, Miss!" rarely lacks a certain air of cheerfulness, especially when the issue of a sweet or biscuit ration may be in prospect. Older children, however, once the novelty has worn off, are less ready to interrupt some interesting piece of work, and exclamations have been heard of: "Bother, there's the old siren again."

This is what happened at a nursery school when the siren sounded during the period of the customary afternoon sleep. three-and-a-half and four-year-olds--who are " prefects" in this school--were roused and went in perfect order, carrying gas mask and blanket, down the steps and took up their places at the end of the shelter, where the caretaker received them. The remaining adult population-eight in number, including cook-formed a chain from the playroom to the shelter steps and the bundles of two-year-olds, still asleep and rolled in their blankets, were passed from end to end and deposited on the shelter seats-still asleep! Then whispered rhymes and stories were taken with the four-yearolds, sweets eaten and drinks of water given. The whole thing was just a great adventure!

It was expected at first that raids would be short but noisy and disturbing. Many experienced Head Teachers believed that they would have to deal with outbreaks of hysterical fear, and community singing was





### Under Fire

favoured as the best means of distracting the children's attention from what might be going on outside. But there was no trouble at all. As one Headmaster put it: "When we had our first daylight raid and there was heavy gunfire all round, I was looking for trouble, until I discovered that the boys were rubbing their hands with glee in expectation of the bomb splinters and other souvenirs they would be able to collect."

On one occasion a voice was heard at the far end of a dark trench: "Now boys, tell me why your hair stands on end when a bomb drops." The answer to this had apparently been given in some preceding physiology lesson. Actually, nature does not seem to show the proper physiological reaction. Many observers have noticed that children seem to be much less affected by the blitz than their elders. It was a small boy of 12 who said: "Now no panic, please," as he picked himself up off the floor where he had taken shelter with the rest of the class, when a bomb fell unexpectedly nearby.

To the average child, war seems to be just a thrilling experience: he has little appreciation, apparently, of possible consequences either to himself or to others. He is only too ready to run to the spot when a damaged aeroplane crashes, or when airmen are said to have come down by parachute. Even when a disaster occurs that affects him nearly, his mind is often filled by some quite trivial incident that has struck his attention. A girl of 8 whose home had just been demolished came running to her teacher—"Oh, Miss, you should have seen my daddy when he came out: he was black all over."

Children's resilience is often due to the fact that they so quickly take the tone of

their surroundings. Where parents are cheerful and show no obvious signs of fear themselves, as is usually the case, children catch their spirit. When, on the other hand, they show any anxiety, this is in some degree passed on.

#### EXPERIMENT AND ADJUSTMENT

At one time air raid alarms were not infrequent during school hours and proved a serious hindrance to school work, when the alert was sounded over a wide area. During the daylight raids on London in the early autumn of 1940, schools in the south-east corner of England found themselves in the front line. Enemy aeroplanes in great numbers passed overhead, usually making for or returning from London, but dropping their bombs indiscriminately and now and again making deliberate attacks on local In these circumstances, shelter periods often upset the whole school day and sometimes lasted for hours at a time.

The shelters had, of course, been designed primarily for safety and for use for short periods, and when long periods of "alert" were common, teachers were hard put to it to keep the children happily engaged. Community singing soon palled-even children's throats give out in time-and other occupations had to be tried which could be carried on in rather cramped conditions and poor light. Knitting, recitations, story-telling, guessing games and spelling bees all did their By degrees, organised shelter programmes were drawn up. With younger children, a trench entertainment might be rehearsed in class, consisting of, say, a dozen items including recitation, charades, a ukulele solo, which groups of children would give in the shelters for the benefit of the rest. Attractive programme covers and even posters were made. Classes would vie with one another in producing the greatest variety of items. The whole thing had rather the air of a party and kept the children fully occupied. It was probably on some such occasion that a little girl, when she heard the All Clear, produced the historic remark: "Please teacher, may we go on with the air raid?"

Except in a few places, the troubles of the long alert in the daytime have now largely disappeared, improvements have been made in the shelters in the way of heating and lighting, and it is possible to continue a certain amount of ordinary work, the children being able to read or write on pads held on their knees.

It is a commonplace that a child's school work is affected by his home life, and the war has produced many changes in the home. When night raids began, the children were often kept awake by the barrage or because their household kept on the alert. But sleeping conditions were quickly adjusted in most homes. The children no longer went upstairs to bed but were put to sleep in what was chosen as the safest placepossibly under the kitchen table or under the stairs. Others were taken to shelters where the conditions at first were not always conducive to good, sound sleep. might be inadequate, the air bad or the public noisy. In infant schools, where rest periods are part of the regular routine, it was comparatively easy to make provision for sleepy children to get their rest. In other schools the children were often allowed to have their sleep out at their desks.

But the children seem to have adapted themselves to the new conditions and most of them are now able to sleep through the noisiest barrage: in fact, there have been cases where children have slept on when the doors and windows of their homes have been blown in.

Apart from air raid interruptions and some irregularity of attendance which naturally follows actual raids, the war has forced many changes and adjustments in the schools in the vulnerable areas. Hours of attendance are shortened and a number of activities have had to be curtailed. On the other hand, the long evenings spent indoors have stimulated a taste for reading and have caused a run on the school and public libraries.

Many war activities are being carried on in all schools. The girls knit comforts for the Forces, lessons in first aid and in war cookery are given and, where possible, boys are digging for victory. In all types of schools Spitfire funds are to be found, and National Savings Associations have developed enormously. During the year 1940 nearly 6,500 new Savings Groups were formed in the schools and the total of such Groups is now well over 30,000. One girls' school of 300 pupils saved over £4,300 in 1940, as against a total in the previous year of £51; while a boys' senior school with 200 on the books totalled over £6,000 in the year, against £60 in the previous year.

Children are born collectors, and the salvage of paper, bottles, bones, aluminium and scrap metal owes not a little to their zeal. Their activities must be organised if good results are to be obtained. In one case the Headmaster assembled his boys and explained to them what was wanted and why it was important. A school "House" competition was arranged to stimulate effort



. . . Play goes on

by inter-House rivalry. A school transport fleet consisting mainly of boxes on wheels was then assembled and the hunt began. The boys scoured the neighbourhood in their spare time and at the end of four months had collected 42 tons of scrap.

#### BROADER KNOWLEDGE

Owing to the loss of time when schools were closed for evacuation, some teachers felt that they ought to concentrate, when work was resumed, on the three R's. The results have been interesting. A junior school, for example, that concentrated on the three R's found after two months that, although the experiment had succeeded in its main aim in bringing the children back to standard in these elements, the pupils were becoming bored and the progress was, in fact, slowing up. It was decided, therefore, to return to a more balanced curriculum. A similar

experiment in an infants' school led to much the same conclusion. In spite of emphasis on reading, the children's powers of expression actually seemed to suffer and their general outlook became more babyish. Such experiences confirm the belief that the broader curriculum of to-day is more beneficial than the narrower one of a generation ago.

In the midst of unprecedented difficulties and dangers the schools are carrying on and, when allowance is made for all the handicaps, their work has suffered much less than might have been expected. The children have implicit confidence in their teachers and feel safe in school, where the quiet atmosphere and steady occupation is one of the best antidotes to war nerves. It says much for the Head Teachers and their staffs that, despite the difficulties they have had to face, they have managed to conceal their own anxieties and worries and inspire such confidence in the children committed to their charge.

### POSTSCRIPT •

The foregoing sketches depict the life of the children. But it is obvious that the welfare and happiness of the children depend largely upon the devotion and skill of the teachers—teachers who, in the main, are not confining their efforts solely to their professional tasks.

Of the depleted staffs that remain in the schools, large numbers of the men are giving their time to the Home Guard, while many others—women as well as men—are serving in various branches of Civil Defence. Indeed, in many districts it is the rule rather than the exception to find every teacher, whether man or woman, engaged in one or more activities in their spare time outside their normal work.

One of the greatest services which the teachers have rendered to the country has been the part which they have played and are playing in the evacuation scheme. But, valuable as is their continuing work for evacuees, a special word of commendation is due for those serving in and around the large towns which have been the targets of the enemy's heavy night bombing. In these

areas, to meet the needs of families rendered homeless, Rest Centres and Feeding Centres are established, and for these purposes schools are naturally selected as providing the most convenient accommodation. The manning of these Centres is often undertaken by the teachers, who thus render service at a time when it is most greatly needed under conditions of great difficulty. In all these ways teachers are making new contacts with their pupils in the country and new contacts with parents in the towns, all of which may have their effect on the place which the schools will occupy in the nation's life in future.

It is sometimes said—though perhaps without any great foundation—that in the ordinary way the schools and the teaching profession stand a little apart and aloof from the main stream of life. When the nation as a whole is "on service," teachers would not wish to claim that they are doing more than others: but one thing is certain—the schools and the teachers are in no sense outside the nation's war effort; they are right in it!



Light against Darkness





## 14 DAY USE RETURN TO DESK FROM WHICH BORROWED

### LOAN DEPT.

This book is due on the last date stamped below, or on the date to which renewed. Renewals only: Tel. No. 642-3405
Renewals may be made 4 days priod to date due, Renewed books are subject to immediate recall.

0CT 13 1970 58	
	-
	_

LD21A-60m-8,'70 (N8837s10)476—A-32

General Library University of California Berkeley



Digitized by Google

